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Scientific and Technical Information Center

Requester's Full Name: Carroll, E. J. Examiner #: 78173 Date: 01/27/93Art Unit: 1661 Phone Number 30 22327 Serial Number: 10/010320Mail Box and Bldg/Room Location: 9C01 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Method of chemical detection of pathogen removed fromInventors (please provide full names): Zhang, J. Wai, Ernesto Leon, Jr.Agustin D. CostaEarliest Priority Filing Date: 13 November 2000

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

elicitor protein polypeptide → plant pathogen

detection ornamental plant

STAFF USE ONLY

Searcher: Alex WacławskiSearcher Phone #: 302-4141Searcher Location: 112-03Date Searcher Picked Up: 1/27/93Date Completed: 1/27/93Searcher Prep & Review Time: 1/27/93Clerical Prep Time: 1/27/93Online Time: 1/27/93

Type of Search

NA Sequence (#) _____

AA Sequence (#) _____

Structure (#) _____

Bibliographic _____

Litigation _____

Fulltext _____

Patent Family _____

Other _____

Vendors and cost where applicable

STN \$372.00

Dialog _____

Questel/Orbit _____

Dr. Link _____

Lexis/Nexis _____

Sequence Systems _____

WWW/Internet _____

Other (specify) _____

=> fil wpids

FILE 'WPIDS' ENTERED AT 11:58:23 ON 27 JAN 2003
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MOST RECENT DERWENT UPDATE: 200306 <200306/DW>
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(FILE 'HCAPLUS' ENTERED AT 11:52:21 ON 27 JAN 2003)
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FILE 'WPIDS' ENTERED AT 11:53:11 ON 27 JAN 2003

L1 3206 S DESSICCAT? OR DESICCAT?
L2 220263 S PLANT#
L3 133061 S PROTEIN# OR PEPTIDE# OR POLYPEPTIDE#
L4 59 S L3 (S) ELICITOR?
L5 1308 S L3 (S) ELICIT?
L6 400 S L1 AND L2
L7 24 S L3 AND L6
L8 3 S L7 AND (L4 OR L5)
L9 179 S ENHANC? (S) LONGEV?
L10 2 S L9 AND L2 AND (L4 OR L5)
L11 3 S L10 OR L8
L12 10605 S CLAVIBACTER OR ERWINIA OR PHYTOPHTHORA OR PSEUDOMONAS OR RALS
L13 52 S L12 AND (L4 OR L5)
L14 3 S L13 AND (L1 OR L9)
L15 3 S L14 OR L11.
L16 48 S L4 AND L2
L17 24 S L16 AND L12
L18 21 S L17 NOT L15

FILE 'WPIDS' ENTERED AT 11:58:23 ON 27 JAN 2003

=> d .wp 115 1-3

L15 ANSWER 1 OF 3 WPIDS (C) 2003 THOMSON DERWENT

AN 2002-575194 [61] WPIDS
DNC C2002-162847
TI Inhibiting **desiccation** of cuttings from ornamental
plants, by treating ornamental **plants** with
hypersensitive response **elicitor protein**, or
expressing heterologous hypersensitive response **elicitor**
protein in plants.
DC C06 D16
IN LEON, E; OVIEDO, A; WEI, Z
PA (EDEN-N) EDEN BIOSCIENCE CORP
CYC 97
PI WO 2002037960 A2 20020516 (200261)* EN 69p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT
RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
AU 2002036469 A 20020521 (200261)
ADT WO 2002037960 A2 WO 2001-US43715 20011106; AU 2002036469 A AU 2002-36469
20011106
FDT AU 2002036469 A Based on WO 200237960
PRAI US 2000-248169P 20001113
AB WO 200237960 A UPAB: 20020924
NOVELTY - Inhibiting (M1) **desiccation** of cuttings from
ornamental **plants** (I), involves treating (I) with a
hypersensitive response **elicitor protein** or
polypeptide (II), or providing a transgenic ornamental
plant (P1) or **plant** seed transformed with a DNA molecule
encoding (II), and growing P1 or transgenic ornamental **plant**
(P2) produced from the transgenic ornamental **plant** seed.
DETAILED DESCRIPTION - M1 involves: (a) treating (I) with (II) under
conditions effective to inhibit **desiccation** of a cutting from
(I), after the cutting is removed from (I); or (b) providing P1 or
plant seed transformed with a DNA molecule encoding (II), and
growing P1 or P2 under conditions effective to inhibit **desiccation**
in a cutting removed from the transgenic **plant**.
INDEPENDENT CLAIMS are also included for the following:
(1) a cutting (IIIa) which has been removed from (I) treated with
(II), where the cutting is characterized by greater resistance to
desiccation as compared to a cutting removed from an untreated
ornamental **plant**;
(2) promoting (M2) early flowering of (I), by treating (I) with (II),
or by providing P1 or **plant** seed transformed with a DNA molecule
encoding (II), and growing P1 or P2;
(3) harvesting (M3) a cutting from (I), by: (a) treating (I) with
(II), and harvesting a cutting from the treated ornamental **plant**
; (b) harvesting a cutting from (I), and treating the harvested cutting
with (II); or (c) providing P1 or **plant** seed transformed with a
DNA molecule encoding (II), and growing P1 or P2 produced from the
transgenic ornamental **plant** seed under conditions, and
harvesting a cutting from the grown transgenic ornamental **plant**,
where the cutting exhibits a reduced susceptibility to **desiccation**
as compared to cuttings removed from non-transgenic ornamental
plant;
(4) a cutting (IIIb) which has been removed from a transgenic
ornamental **plant** which expresses (II), where the cutting is
characterized by greater resistance to **desiccation** as compared
to a cutting removed from a non-transgenic ornamental **plant**; and
(5) **enhancing** (M4) the **longevity** of flower blooms

on ornamental **plant** cuttings, by: (a) providing P1 or **plant** seed transformed with a DNA molecule encoding (II), and growing P1 or P2; (b) treating (I) with (II); or (c) harvesting a cutting from (I) and treating the harvested cutting with (II).

ACTIVITY - None given.

MECHANISM OF ACTION - Dessication inhibitor; **Longevity enhancer**.

Mature rose **plants** were treated with Messenger (coded as EBC-151) by foliar sprays and postharvest treatment to improve flower quality and longevity. The trial was established in a commercial rose greenhouse. The rose variety in this trial was Vega. Individual plot beds contained approximately 44 mature **plants** arranged in two rows; each plot was replicated 4 times and measured 80 cm wide by 15.4 m long. EBC-151 treatments were applied with a CO2-powered backpack sprayer calibrated to deliver 430 l/Ha at 90 psi. Preharvest applications of each EBC-151 treatment were repeated at approximately 14-d intervals. After the fifth preharvest application, 10 mature flower/stems were randomly selected from each treatment and evaluated. Treatment effects were evaluated on cut flowers by assessing the number of open flowers and the number of straight stems on each flower/stem. No preharvest applications of EBC-151 were made to flower/stems harvested after the fifth application of EBC-151. Visual observations of cut roses 16 days after postharvest treatment were made for treatments that received postharvest applications of EBC-151. Roses that had been treated with the postharvest application of EBC-151 appeared to have substantially greater longevity than those that had not received the postharvest treatment. Results of this trial demonstrated a treatment effect for application of EBC-151 Messenger to roses. The effect was seen in a substantially greater increase in the number of open flowers at harvest. This effect is of significant commercial benefit to rose growers. In addition, the postharvest application of EBC-151 to cut roses resulted in substantially extending the shelf life of the cut roses.

USE - (II) is useful for inhibiting dessication of cuttings from ornamental **plants**, for harvesting cutting from ornamental **plants**, for promoting early flowering of ornamental **plants**, and **enhancing the longevity** of flower blooms on ornamental **plant** cuttings (claimed).

ADVANTAGE - (II) can be easily expressed transgenically in or applied topically to ornamental **plants** or cuttings, hence it offers an effective, simple-to-use, non-toxic approach for inhibiting dessication of cuttings from ornamental **plants**, for harvesting cutting from ornamental **plants**, for promoting early flowering of ornamental **plants**, and **enhancing the longevity** of flower blooms on ornamental **plant** cuttings. By inhibiting dessication of cuttings are less likely to wilt and die before they are received by the retailer. This will dramatically decrease losses associated with long transportation rates in less than ideal conditions.
Dwg.0/3

TECH

UPTX: 20020924

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Method: (II) is derived from a **plant** pathogen e.g. **Erwinia**, **Pseudomonas**, **Ralstonia**, **Xanthomonas**, **Clavibacter**, and **Phytophthora**. M1 further involves removing a cutting from the treated ornamental **plant** and applying (II) to the removed cutting. The cutting comprises stem, leaf, flower or their combinations. (II) is expressed in flower tissues of the cutting.

L15 ANSWER 2 OF 3 WPIDS (C) 2003 THOMSON DERWENT
AN 2002-257464 [30] WPIDS
CR 2000-328939 [26]

DNC C2002-076625
 TI New **Xanthomonas** hypersensitive response **elicitor protein**, useful for imparting disease resistance to **plants**, enhancing **plant** growth and controlling insects in **plants**.
 DC C06 D16 P13
 IN FAN, H; SWANSON, S S; WEI, Z .
 PA (FANH-I) FAN H; (SWAN-I) SWANSON S S; (WEIZ-I) WEI Z; (EDEN-N) EDEN BIOSCIENCE CORP
 CYC 94
 PI WO 2002012293 A2 20020214 (200230)* EN 61p
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
 W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
 US 2002066122 A1 20020530 (200240)
 AU 2001078063 A 20020218 (200244)
 ADT WO 2002012293 A2 WO 2001-US23787 20010727; US 2002066122 A1 Provisional US 1998-103124P 19981005, GIP of US 1999-412452 19991004, Provisional US 2000-224053P 20000809, US 2001-829124 20010409; AU 2001078063 A AU 2001-78063 20010727
 FDT AU 2001078063 A Based on WO 200212293
 PRAI US 2001-829124 20010409; US 2000-224053P 20000809; US 1998-103124P 19981005; US 1999-412452 19991004
 AB WO 200212293 A UPAB: 20020711
 NOVELTY - An isolated **Xanthomonas** hypersensitive response (XcpHR) **elicitor protein** (I) comprising a sequence (S1) of 114 amino acids fully defined in the specification, or a **protein** encoded by a DNA that hybridizes to a complement of a sequence (S2) comprising 342 nucleotides fully defined in the specification, in hybridization medium comprising 2X standard saline citrate (SSC), 0.1% sodium dodecyl sulfate (SDS) at 56 deg. C, is new.
 DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:
 (1) an isolated DNA molecule (II) encoding (I);
 (2) an expression vector (III), a host cell (IV), a transgenic **plant** (V) or a transgenic **plant** seed (VI), all transformed with (II);
 (3) a cutting (VII) removed from (V) (an ornamental **plant**), and characterized by greater resistance to **desiccation** as compared to a cutting removed from a non-transgenic ornamental **plant**, where the cutting or the ornamental **plant** is treated with (I);
 (4) a transgenic **plant** (Va) comprising a first DNA molecule encoding a transcript or a **protein** or **polypeptide** that confers a trait, and a second DNA molecule encoding (I), which is different than the **protein** or **polypeptide** encoded by the first DNA molecule;
 (5) a transgenic **plant** seed obtained from (Va);
 (6) applying (I) to a **plant** or **plant** seed comprising a transgene conferring a transgenic trait; and
 (7) providing a **plant** cell, transforming the **plant** cell with a first DNA molecule encoding a transcript or a **protein** or **polypeptide** which confers a trait to a **plant** grown from the transformed **plant** cell, and a second DNA molecule encoding (I), under conditions effective to produce a transgenic **plant** cell, and regenerating a transgenic **plant** from the transformed **plant** cell.

ACTIVITY - None given.

MECHANISM OF ACTION - Enhances **plant** growth; inhibits **desiccation** of cuttings from ornamental **plants**; promotes early flowering of ornamental **plants** (claimed). Tomato seeds were soaked in solution containing the XcpHR elicitor for more than 4 hours. Seeds soaked in the same solution without the elicitor served as a control. The elicitor treated **plants** were observed to have 15-20% greater average growth than the control **plants**.

USE - (I) and (II) are useful for imparting disease resistance to **plants**, enhancing **plant** growth, providing insect control for **plants**, imparting stress resistance to **plants**, inhibiting post-harvest disease or **desiccation** of a fruit or vegetable, inhibiting **desiccation** of cuttings from ornamental **plants**, harvesting a cutting from an ornamental **plant**, and promoting early flowering of an ornamental **plant**. (I) or (II) is also useful for providing disease resistance, insect resistance, enhanced growth, herbicide resistance, stress tolerance, male sterility, modified flower color and biochemically modified **plant** product in transgenic **plants** given in the specification (claimed).

ADVANTAGE - (I) provides greater yield, increased percentage of seeds germinated, increased **plant** size, greater biomass, ~~more and~~ bigger fruit, earlier fruit coloration, earlier flower opening, improved flower longevity (i.e. shelf-life), and earlier fruit and **plant** maturation. As a result, (I) provides significant economic benefit to growers. (I) enables produce growers, warehouse packers, shippers and suppliers to process, handle, and store fruits and vegetables with reduced losses caused by post-harvest disease and **desiccation**.
Dwg.0/1

TECH

UPTX: 20020513

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preparation: (I) and (II) are produced by standard recombinant techniques.

Preferred Sequence: (II) comprises a DNA molecule encoding S1, a DNA molecule which hybridizes to a DNA molecule complementary to a nucleotide sequence comprising S2 in a hybridization medium comprising 2X SSC, 0.1% SDS at 56 degrees C, or a DNA molecule complementary to the above said DNA molecules. (II) is in sense orientation and correct reading frame.

Preferred Host Cell: (IV) is a **plant** or bacterial cell, in which (II) is transformed with (III).

Preferred Transgenic **Plant**: In (Va), the first DNA molecule encodes a **protein** or **polypeptide** selected from any one of the **proteins** given in the specification, e.g. Bacillus thuringiensis toxin, Photorhabdus luminescens **protein**, protease inhibitors, etc. The first DNA molecule encodes a transcript selected from antisense RNA and sense RNA.

L15 ANSWER 3 OF 3 WPIDS (C) 2003 THOMSON DERWENT

AN 2002-041357 [05] WPIDS

DNC C2002-011737

TI Inhibiting post harvest disease (caused by Penicillium, Botrytis, **Phytophthora**, or **Erwinia**) or **desiccation** and **enhancing the longevity** in a fruits or vegetables, using hypersensitive response **elicitor proteins** or nucleic acids.

DC C06 D16

IN QIU, D; REMICK, D; WEI, Z

PA (QIUD-I) QIU D; (REMI-I) REMICK D; (WEIZ-I) WEI Z; (EDEN-N) EDEN
BIOSCIENCE CORP

CYC 95

PI WO 2001080639 A2 20011101 (200205)* EN 66p

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ

NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM
DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC
LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE
SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

US 2002019337 A1 20020214 (200214)

AU 2001053593 A 20011107 (200219)

EP 1274307 A2 20030115 (200306) EN

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI TR

ADT WO 2001080639 A2 WO 2001-US12468 20010417; US 2002019337 A1 Provisional US
2000-198359P 20000419, US 2001-835684 20010416; AU 2001053593 A AU
2001-53593 20010417; EP 1274307 A2 EP 2001-927112 20010417, WO
2001-US12468 20010417

FDT AU 2001053593 A Based on WO 200180639; EP 1274307 A2 Based on WO 200180639
PRAI US 2000-198359P 20000419; US 2001-835684 20010416

AB WO 200180639 A UPAB: 20020123

NOVELTY - Methods for inhibiting post harvest disease or
desiccation and **enhancing the longevity** in a
fruits or vegetables, using hypersensitive response **elicitor**
proteins or **polypeptides** or nucleic acids derived from
pathogens (*Erwinia* (*E. amylovora*, *E. stewartii*, *E. chrysanthemi*,
E. carotovora), *Xanthomonas*, *Pseudomonas* (*P. syringae*,
P. solanacearum), *Phytophthora* (especially), and
Clavibacter), are new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the
following:

(1) a method (I) of inhibiting post harvest disease or
desiccation in a fruit or vegetable, comprising treating a fruit
or vegetable with a hypersensitive response **elicitor**
protein or **polypeptide** under conditions effective to
inhibit post harvest disease or **desiccation**;

(2) a method (II) of inhibiting post harvest disease or
desiccation in a fruit or vegetable, comprising providing a
transgenic **plant** or **plant** seed transformed with a DNA
molecule encoding a hypersensitive response **elicitor**
polypeptide or **protein** and growing the transgenic
plant or transgenic **plant** produced from the transgenic
plant seed under conditions effective to inhibit a post harvest
disease or **desiccation** in a fruit or vegetable harvested from
the transgenic **plant**;

(3) a DNA construct (III) comprising:

(a) a DNA molecule encoding a hypersensitive response
elicitor protein or **polypeptide**;

(b) a **plant**-expressible promoter operably coupled 5' to the
DNA molecule (the promoter being effective to transcribe the DNA molecule
in fruit or vegetable tissue); and

(c) a 3' regulatory region operably coupled to the DNA molecule
(expression of the DNA molecule in fruit or vegetable tissue imparts to a
fruit or vegetable resistance against post harvest disease or
desiccation);

(4) an expression system (IV) comprising a vector into which is
inserted the heterologous DNA construct (III);

(5) a host cell (V) comprising the heterologous DNA construct (III);

(6) a transgenic **plant** (VI) comprising the heterologous DNA
construct (III);

(7) a method (VII) of **enhancing the longevity** of
fruit or vegetable ripeness comprising treating a fruit or vegetable with
a hypersensitive response **elicitor protein** or
polypeptide under conditions effective to **enhance the**

longevity of fruit or vegetable ripeness; and

(8) a method (VIII) of **enhancing the longevity** of fruit or vegetable ripeness comprising providing a transgenic **plant** or **plant** seed transformed with a DNA molecule encoding a hypersensitive response **elicitor polypeptide** or **protein** and growing the transgenic **plant** or transgenic **plant** produced from the transgenic **plant** seed under conditions effective to **enhance the longevity** of fruit or vegetable ripeness in a fruit or vegetable harvested from the transgenic **plant**.

ACTIVITY - Bactericidal.

The effect of treating orange fruits with Messenger (RTM) on post harvest orange storage was studied. On day 0, Fall-GLO orange fruits were treated by spraying Messenger (RTM) solution (15 micrograms/mL) or buffer solution (5mM KPO₄, pH 6.8) on the surface of fruits in a 22 deg. C greenhouse. The Messenger (RTM) or buffer solutions on oranges were then dried by air, and the treated oranges were marked, mixed together, and put into a plastic container.

The container with treated oranges was then put into an 18 deg. C growth chamber for storage. On day 7, orange fruits were inoculated with *Penicillium digitatum* and *Botrytis cinerea* by spraying a 10⁵ cfu/ml suspension on the surface of orange fruit. The procedure was performed on 40 orange fruits per treatment. Measurements of disease were conducted on days 20, 24, and 26 following treatment with Messenger (RTM) or buffer solution.

The results showed that the Messenger (RTM) was more effective than buffer as a fruit spray treatment in reducing disease index for *Penicillium digitatum* and *Botrytis cinerea* and providing longer storage life.

Messenger (RTM) treatment can reduce orange disease about 58.14% at 21 days, about 45.21% at 25 days, and 36.97% at 27 days after spraying treatment and 18 deg. C storage conditions. T-testing showed that there were statistically significant differences at both 95% and 99% confidence levels.

MECHANISM OF ACTION - Gene therapy.

USE - The methods are used for inhibiting post harvest disease (caused by *Penicillium*, *Botrytis*, *Phytophthora*, or *Erwinia*) or **desiccation** and **enhancing the longevity** in a fruits or vegetables (claimed).

ADVANTAGE - The methods enable growers, warehouse packers, shippers and suppliers to process, handle and store fruit and vegetables with reduced losses caused by post harvest disease and **desiccation**, therefore reducing costs to the consumer and improving quality.
Dwg.0/0

TECH

UPTX: 20020123

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Methods: In methods (I) and (VII) the hypersensitive response **elicitor protein** or **polypeptide** is in isolated form. In (I), (II), (VII) and (VIII) the treatment is carried out prior to or after harvest of the fruit or vegetable by either spraying the fruit or vegetable with the hypersensitive response **elicitor protein** or **polypeptide** or out by immersing the fruit or vegetable in the hypersensitive response **elicitor protein** or **polypeptide**. The hypersensitive response **elicitor protein** or **polypeptide** is in liquid or powder form. The hypersensitive response **elicitor protein** or **polypeptide** is derived from a species of pathogen selected from *Erwinia* (*E. amylovora*, *E. stewartii*, *E. chrysanthemi*, *E. carotovora*), *Xanthomonas*, *Pseudomonas* (*P. syringae*, *P. solanacearum*), *Phytophthora* (especially), and

Clavibacter.

The treatment inhibits **desiccation** or a post harvest disease (caused by *Penicillium*, *Botrytis*, *Phytophthora*, or *Erwinia*) in a fruit or vegetable.

In the method (II) a transgenic **plant** or seed is produced. The transgenic **plant** is a dicot or a monocot. The method further comprises applying the hypersensitive response **elicitor** **polypeptide** or **protein** to the fruit or vegetable to inhibit post harvest disease or **desiccation**.

Preferred Cells: The host cell (V) is a **plant** cell or a bacteria cell (*Agrobacterium*).

=> d .wp 118 1-21

L18 ANSWER 1 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 2002-179786 [23] WPIDS

DNC C2002-055895

TI New inducible promoter from the tobacco lipoxygenase gene, useful for preparing transgenic **plants** that express disease- or pest-resistance genes.

DC C06 D16 P13

IN BEFFA, R; ESQUERRE, T M T; FOURNIER, J; GROSJEAN, C M C; VERDAGUER, B; ESQUERRE-TUGAYE, M; GROSJEAN-COURNOYER, M

PA (RHOB-N) RHOBIO SA; (RHOB-N) RHOBIO

CYC 96

PI WO 2002006443 A2 20020124 (200223)* FR 41p

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
NL OA PT SD SE SL SZ TR TZ UG ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU
SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

FR 2811680 A1 20020118 (200223)

AU 2001072636 A 20020130 (200236)

ADT WO 2002006443 A2 WO 2001-FR2216 20010710; FR 2811680 A1 FR 2000-9250
20000713; AU 2001072636 A AU 2001-72636 20010710

FDT AU 2001072636 A Based on WO 200206443

PRAI FR 2000-9250 20000713

AB WO 200206443 A UPAB: 20020411

NOVELTY - Polynucleotide (I) containing a **plant** promoter regulatory region (A) comprising a 2330 bp sequence (1), reproduced.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) polynucleotide (Ia) that hybridizes selectively to (1) or has at least 80% homology with (1);

(2) expression cassette (EC) functional in **plants** and **plant** cells comprising a 5'-(I) or (Ia), coding sequence, and 3'-regulatory region;

(3) vector containing (I), (Ia) or EC;

(4) method for transforming **plant** cells by integrating into the genome at least one (I), (Ia), EC or the vector of (3);

(5) transformed **plant** cells produced by method (4);

(6) method for producing transgenic **plants** by regeneration from cells of (5), and optionally crossing with other **plants**; and

(7) **plants** produced by method (6) or their seeds.

USE - (I), where part of an expression cassette or vector, is used to produce transgenic **plants** (claimed), especially those that express (under control of (I)) a protein that imparts resistance to

diseases (bacterial, fungal or viral, especially **Phytophthora**) or insects.

ADVANTAGE - (I) is inducible by pathogens, at a very early stage, before development of necrosis or other symptoms.

Dwg.0/4

TECH

UPTX: 20020411

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Materials: The promoter activity of (I) or (Ia) is induced in response to attack by a pathogen. (1) is the promoter of the tobacco (*Nicotiana tabacum*) lipoxygenase-1 gene (LOX1) and is functional in the cotyledon of the embryo; hypocotyl and cotyledon leaves during germination; in the 'neck' and petioles during growth and in the reproductive organs. It is induced by methyl jasmonate; 1-aminocyclopropane-1-carboxylic acid; heavy metals and lambda-carragheenane. In EC, the coding sequence encodes either a reporter or a **protein** that confers resistance to diseases or insects, particularly a fungal **elicitor** or lytic **peptide**, e.g. a chitinase, glucanase or oxalate oxidase, antimicrobial **peptide** or *Bacillus thuringiensis* insecticidal toxin.

Preferred **plants**: Transgenic **plants** are specifically tobacco, wheat, barley, sorghum, maize, rice, rape, cotton, sunflower, sugar beet and clover.

Preparation: A 1.4 kb cDNA fragment from the known pathogen-induced LOX gene of tobacco was used to screen a phage library of tobacco genomic DNA to identify the 2330 bp sequence (1), containing the 5'-end of the LOX gene and the upstream regulatory sequences. Analysis indicated presence of **elicitor** response elements upstream of the TATA box. Once isolated, the promoter can be inserted into standard vectors and these used for production of transgenic **plants** conventionally.

L18 ANSWER 2 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 2002-130707 [17] WPIDS

DNC C2002-040123

TI Improving effectiveness of transgenic **plants** by topical application of a hypersensitive response **elicitor protein** to the transgenic **plant** or by incorporating into the **plant** a transgene encoding the **protein**.

DC C06 D16

IN DEROCHER, J E; WEI, Z; DEROCHER, J

PA (EDEN-N) EDEN BIOSCIENCE CORP; (DERO-I) DEROCHER J E; (WEIZ-I) WEI Z

CYC 94

PI WO 2001095724 A2 20011220 (200217)* EN 86p

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
NL OA PT SD SE SL SZ TR TZ UG ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM
DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC
LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE
SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW

AU 2001066879 A 20011224 (200227)

US 2002059658 A1 20020516 (200237)

ADT WO 2001095724 A2 WO 2001-US18955 20010613; AU 2001066879 A AU 2001-66879 20010613; US 2002059658 A1 Provisional US 2000-211585P 20000615, US 2001-880371 20010613

FDT AU 2001066879 A Based on WO 200195724

PRAI US 2000-211585P 20000615; US 2001-880371 20010613

AB WO 200195724 A UPAB: 20020313

NOVELTY - Improving (I) the effectiveness of transgenic **plants**, comprising applying a hypersensitive response **elicitor** (HRE) **protein** or **polypeptide** to the transgenic **plant** or incorporating into the transgenic **plant** a transgene encoding a HRE **protein** or **polypeptide**, is new.

DETAILED DESCRIPTION - Improving (I) the effectiveness of transgenic plants, comprising:

(a) providing a **plant** or **plant** seed comprising a transgene conferring a transgenic trait to the **plant** or a **plant** grown from the **plant** seed, and applying to the **plant** or **plant** seed a HRE protein or polypeptide;

(b) providing a **plant** cell, transforming the **plant** cell with a first DNA molecule (D1) encoding a transcript or a protein or polypeptide which confers a trait to a **plant** growth from the transformed **plant** cell, and a second DNA molecule (D2) encoding a HRE protein or polypeptide which is different from the protein or polypeptide encoded by D1, under conditions effective to produce a transgenic **plant** cell, and regenerating a transgenic **plant** from the transformed **plant** cell.

INDEPENDENT CLAIMS are also included for the following:

(1) a transgenic **plant** (II) comprising D1 and D2;

(2) a transgenic **plant** seed obtained from (II);

(3) a DNA construct (III) comprising D1 and D2;

(4) a system (IV) for use in transforming **plants** with multiple DNA molecules, comprising (III);

(5) an expression system comprising first and second vectors into which (IV) is inserted;

(6) a transgenic host cell (V) comprising D1 and D2; and

(7) an expression system comprising a vector into which is inserted a heterologous (III).

USE - For improving the effectiveness of transgenic **plants** by maximizing the benefit of transgenic traits associated with a deleterious effect on growth, stress tolerance, disease or insect resistance, enhanced growth, herbicide resistance, male sterility, modified flower color, and biochemically modified **plant** product in the transgenic **plants** or overcoming the deleterious effects (claimed).

Dwg.0/0

TECH

UPTX: 20020313

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Method: The HRE protein or polypeptide is applied under conditions effective to impart enhanced growth, stress tolerance, disease or insect resistance to the **plant** or the **plant** grown from the **plant** seed, which maximizes the benefit of the transgenic trait to the **plant** or the **plant** grown from the **plant** seed. The protein is applied on the **plant** or **plant** seed, by spraying, immersion, injection, dusting, coating or leaf abrasion at a time proximate to when the applying takes place. The protein is applied to the **plant** or **plant** seed as a composition further comprising a carrier such as water, aqueous solutions, slurries and powders. The composition contains greater than 0.5 nM of the HRE protein derived from a species of pathogens such as *Erwinia*, *Xanthomonas*, *Pseudomonas*, *Phytophthora* and *Clavibacter*. The **plant** cell is transformed with D1 and D2 by *Agrobacterium*. The **plant** cell is transformed with D1 to form a singly transformed **plant** cell and then transformed with D2 or vice versa. Transforming is performed under conditions effective to insert D1 and D2 into the genome of the transformed **plant** cell. Transforming comprises propelling particles at the **plant** cell under conditions effective for the particles to penetrate into the cell interior and introducing one or more expression vectors comprising D1, D2 or both into the **plant** cell interior. D1 encodes a protein or polypeptide chosen from *Bacillus thuringiensis* toxin, *Photobacterium luminescens* protein, protease inhibitors, amylase inhibitors, lectins, chitinases, endochitinase, chitinase, defensins, osmotins, crystal

proteins, virus proteins, herbicide resistance proteins, mannitol dehydrogenase, PG inhibitors, ACC degradation proteins, barnase, phytase, fructans, invertase and SAMase. D1 encodes a transcript chosen from antisense RNA which interferes with activity of an enzyme or synthesis of a product, and a sense RNA, and comprises a promoter operable in **plants**, a DNA coding sequence operably coupled 3' of the promoter, encoding the transcript or the protein or polypeptide which confers the trait, and a 3' regulatory region operably coupled to the DNA coding sequence. D2 comprises a promoter, DNA coding sequence encoding HRA protein or polypeptide and a 3' regulatory region.

Preferred **Plant**: In (II), D1 and D2 are stably inserted into the genome of the **plant** and is chosen from rice, wheat, barley, rye, cotton, sunflower, peanut, corn, potato, sweet potato, bean, pea, chicory, lettuce, endive, cabbage, canola, cauliflower, broccoli, turnip, radish, spinach, onion, garlic, eggplant, pepper, celery, carrot, squash, pumpkin, zucchini, cucumber, apple, pear, melon, strawberry, cranberry, grape, raspberry, pineapple, soybean, tobacco, tomato, sorghum and sugarcane.

Preferred Construct: In (III), first and second promoters are different and the first promoter is inducible.

Preferred Cell: (V) is a bacterial (Agrobacterium) or **plant cell**.

L18 ANSWER 3 OF 21 WPIDS (C) 2003 THOMSON DERWENT
 AN 2002-055588 [07] WPIDS
 CR 2001-389883 [37]
 DNC C2002-015949
 TI Identifying **plant** disease resistance gene (R) or **elicitor** (E) with desired property by recombining R and E genes to form nucleic acid population encoding R **protein** or E from which desired R **protein** and E are detected.
 DC C06 D16
 IN ENGLISH, J; LASSNER, M; WU, G
 PA (MAXY-N) MAXYGEN INC; (ENGL-I) ENGLISH J; (LASS-I) LASSNER M; (WUGG-I) WU G
 CYC 95
 PI WO 2001085909 A2 20011115 (200207)* EN 65p
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
 NL OA PT SD SE SL SZ TR TZ UG ZW
 W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
 DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ
 LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD
 SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
 AU 2001059471 A 20011120 (200219)
 US 2002035739 A1 20020321 (200224)
 ADT WO 2001085909 A2 WO 2001-US14419 20010504; AU 2001059471 A AU 2001-59471
 20010504; US 2002035739 A1 Provisional US 2000-202233P 20000505, US
 2001-849452 20010504
 FDT AU 2001059471 A Based on WO 200185909
 PRAI US 2000-202233P 20000505; US 2001-849452 20010504
 AB WO 200185909 A UPAB: 20020416
 NOVELTY - Identifying **plant** disease resistance (R) gene with specified characteristic, or **elicitor** (E) of **plant** defense response with desired property, comprising recombining nucleic acids (NA) corresponding to R gene and genes encoding (E) (or enzyme catalyzing production of (E)) to form library of NA encoding R **proteins** or (E) and detecting R **protein** and (E) with desired properties, is new.
 DETAILED DESCRIPTION - Identifying (M1) R gene with a specified characteristic, comprising:
 (a) providing several R gene segments;

- (b) recombining several R gene segments to produce a library of recombinant R gene segments;
- (c) optionally repeating the recombination steps one or more times;
- (d) expressing at least one recombinant R gene segment in at least one **plant** cell, and exposing the **plant** cell to (E) of a **plant** defense response; and
- (e) detecting at least one **plant** defense response, and thereby identifying R gene with a specified characteristic.

Identifying (M2) (E) of a **plant** defense response with a desired property, comprising:

- (a) providing several NA segments comprising at least one (E) or enzyme catalyzing production of (E) of a **plant** defense response;
- (b) recombining several NA segments, thereby producing a library of recombinant NAs encoding (E)s or enzymes catalyzing production of (E)s;
- (c) optionally repeating the recombination steps one or more times;
- (d) exposing at least one **plant** cell to at least one (E) encoded by or produced by an enzyme encoded by a member of the library of the above mentioned recombinant NA; and
- (e) detecting at least one **plant** defense response, identifying at least one (E) with a desired property.

INDEPENDENT CLAIMS are also included for the following:

- (1) a transgenic **plant** (I) produced by integrating the at least one R gene with specified characteristic as identified by (M1), operably linked to a promoter functional in a **plant** cell into the genome of the **plant** cell and regenerating the **plant** cell;
- (2) identifying (M3) a functional interaction between R gene and (E), comprising:
 - (a) introducing a first viral vector comprising R gene and a second viral vector comprising a gene encoding (E) or enzyme catalyzing production of (E) into at least one **plant** cell, such that R gene and (E) are cytoplasmically expressed in at least one **plant** cell; and
 - (b) detecting at least one **plant** defense response;
- (3) identifying (M4) a functional interaction between R gene and (E), comprising:
 - (a) exposing at least one **plant** cell or a **plant** pathogen comprising an (E) of a **plant** defense response and R gene; and
 - (b) detecting at least one **plant** defense response;
- (4) a bio-detector (II) comprising R gene encoding a product capable of activation by at least one (E) and a reporter operably linked to a promoter responsive to activated product of R gene;
- (5) a **plant** or **plant** cell (III) comprising (II); and
- (6) producing (M5) a gene with a desired property, comprising:
 - (a) introducing several RNA viral vectors comprising one or more gene of interest into at least one cell;
 - (b) growing the cell under conditions permitting cytoplasmic recombination between several RNA viral vectors, thereby producing a library of recombinant RNA viral vectors;
 - (c) optionally recovering at least one recombinant viral vector and repeating the above two steps; and
 - (d) identifying at least one RNA viral vector comprising a gene with a desired property.

USE - For identifying a **plant** disease resistance gene with a specified ligand binding, downstream signaling or kinase activation characteristic, and identifying an (E) of a **plant** defense response with a desired binding property or response elicitation. R gene with a specified characteristic as identified by (M1), is useful for

conferring resistance to at least one **plant** pathogen when introduced into a **plant** or **plant** cell. Introducing R gene with specified characteristic is carried out by inoculating the **plant** or **plant** cell with a non-integrating viral vector comprising R gene. Optionally, introduction of R gene is carried out by stably integrating R gene with specified characteristic operably linked to a promoter functional in a **plant**, into a **plant** cell, and regenerating the **plant** cell comprising R gene with specified characteristic into a transgenic **plant**. (E) with a desired property as identified by (M2) is useful for inducing a **plant** defense response on exposure to at least one **plant** cell. (All claimed). The novel R gene and associated signaling pathways are useful as bio-detectors or other environmental stressors. The evolved R genes can be stably integrated into **plant** genomes, and confer resistance to pathogens and other stresses upon **plants** growing in the field. The evolved R genes induce a reduced systemic acquired resistance (SAR) e.g. leads to decreased phenylpropanoid biosynthesis that leads to decreased levels of salicylic acid and confers improved resistance to insect pests. Also the R genes engineered into **plants** provide the **plant** with specific resistance to viral, bacterial, fungal and nematode parasites.

ADVANTAGE - The methods provide a means to identify and manipulate the components of plant disease response pathways to produce plants with enhanced disease resistance traits. The methods of diversifying DNA and RNA enable the production and selection with novel (E) specificities, multielicitor specificities and improved signaling capabilities, as well as the production of novel elicitors with desired properties. By using nucleic acid diversification and screening or selection procedures to evolve leucine-rich-repeat (LRR) domain of disease resistance genes, novel recognition specificities not found in nature, are engineered into receptors capable of interacting with a wide variety of ligands. Diversification of R gene also provides a means for developing robust resistance to pathogens for which innate specific resistance is weak or absent in a natural population.

Dwg.0/1

TECH

UPTX: 20020130

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Method: (M1) and (M2) further involves repeating the recombination and screening process at least one additional time. In (M1), the R gene segments comprise at least one NA of a R gene of tomato, rice, Arabidopsis, barley, corn, soybean, flax, sugarbeet or wheat. The R gene segments comprise at least one NA of the homologs Bs2, Cf2, Cf4, Cf5, Cf9, Dm3, Fen, Hcr2, Hcr9, Hsl(pro-1), I2, L6, LRR10, M, Mlo, Mi, N, Pib, PRF, Ptil, Pto, Rpl-D, RPM1, RPP, RPS2, RPS4, Rx, Xal or Xa21. (M1) further involves mutating the R gene segments provided in the initial step of the method. Recombination is carried out in vivo, in vitro or in silico. The method preferably involves recombining RNA viruses comprising R gene segments or (E) or enzyme catalyzing production of (E) in vivo, preferably in **plant** cells. Expressing the recombinant R gene segment involves stably integrating at least one recombinant R gene operably linked to a promoter functional in a **plant** cell into the genome of at least one **plant** cell.

Optionally, the recombinant R gene segment is expressed by inoculating the at least one **plant** cell with a non-integrating viral vector ((+) strand RNA viruses, (-) strand RNA viruses, ambisense viruses, single-stranded or double-stranded DNA viruses) comprising at least one recombinant R gene. Preferably, the non-integrating viral vector is a tobamovirus, potexvirus, potyvirus, a tobnavirus, or a geminivirus. The expression of R gene is regulated by at least one viral or non-viral promoter active in the **plant** cell. Preferably, the promoter is a viral sub-genomic promoter. Alternatively, expressing at least one

recombinant R gene segment which further comprises a targeting signal (AvrBs2 or AvrPto target signal), involves infecting the at least one **plant** cell with a **plant** pathogen (e.g. a bacterial **plant** pathogen such as *Pseudomonas* sp.) comprising at least one recombinant R gene. The **plant** cell is exposed to (E) which is a product of Avr (avirulence) gene or Avr gene homolog. The method involves exposing the **plant** cell to an Avr gene product produced by a **plant** pathogen, where the Avr gene product produced by the **plant** pathogen is a heterologous Avr gene product. Optionally, the **plant** cell is exposed to an Avr gene product produced by a non-pathogenic microorganism or virus, e.g., a non-integrating viral vector. Alternatively, the **plant** cell is exposed to an Avr gene product produced by the **plant** cell which is a transgenic **plant** cell expressing an Avr gene. In (M1), the **plant** defense response which is detected is a hypersensitive (HR) response, a systemic acquired resistance (SAR) response, an induction of genes associated with a HR or a SAR, an accumulation of gene products or compounds associated with a HR or a SAR or a resistance to an infection by a **plant** pathogen. The method preferably involves detecting resistance to an infection by a **plant** pathogen by detecting a decrease in symptoms or a decrease in pathogen (bacterial, fungal, insect or nematode pathogen) growth. The **plant** defense response is detected by one or more of viability staining, visualization of local lesions, measuring calcium flux or monitoring electrolyte leakage. (M1) further involves recovering R gene with a specified characteristic by polymerase chain reaction (PCR), ligase chain reaction, Qbeta amplification, cloning, isolation of an RNA transcript or by reverse transcription of e.g. a viral RNA transcript. The recovery method further involves integrating the at least one R gene with a specified characteristic operably linked to a promoter functional in a **plant** cell into the genome of a **plant** cell, and regenerating a **plant** cell to produce a transgenic **plant** that expresses a product of R gene with specified characteristic. The transgenic **plant** is exposed to (E) which is the product of a recursively recombined Avr gene or Avr gene homolog, or a recursively recombined gene encoding an enzyme catalyzing the production of (E). By exposing the transgenic **plant** to (E), an (E) with desired property such as interacting with the product of the R gene with a specified characteristic, is identified by detecting at least one **plant** defense response. In (M2), the several NA segments used in the initial step comprises at least one of viral NA, bacterial NA, fungal NA, insect NA or nematode NA. The NA segments alternatively comprise an Avr gene or Avr gene homolog. The **plant** cell is exposed to an (E) by externally applying the at least one (E) to at least one **plant** cell, or by inoculating the **plant** cell with a non-integrating viral vector as described above which comprises a member of the library of recombinant NA encoding (E) or enzyme catalyzing production of (E). The expression of (E) or enzyme catalyzing production of (E) is regulated by at least one viral or non-viral promoter active in the **plant** cell. Preferably, the promoter is a viral subgenomic promoter. Optionally, the **plant** cell is a cultured **plant** cell, a **plant** protoplast, a **plant** tissue, an isolated **plant** organ, an intact **plant** organ or a whole **plant** is exposed to an (E) by infecting the at least one **plant** cell with a **plant** pathogen e.g. *Pseudomonas* sp. comprising a member of the library or recombinant NA encoding (E) or enzyme catalyzing production of (E). Preferably, the **plant** cell expresses recursively recombined R gene with a specified characteristic and is a transgenic **plant** cell. The **plant** defense response (PDR) which is detected is HR, SAR response, induction of a gene

associated with HR or SAR response, accumulation of gene products or compounds associated with HR or SAR response, or a resistance to infection. (M2) further involves recovering NA encoding (E) or enzyme catalyzing production of (E) with a desired property by a method as described above. In (M3), the viral vectors employed are non-integrating viral vectors as described above, and where the expression of the R gene is regulated by a viral subgenomic promoter. At least one of R gene, or gene encoding (E) or enzyme catalyzing production of (E) is a member of a library of genes or gene segments, which library comprises one or more of a genomic library, an expression library, a transcript library, a DNA library, an RNA library, a PCR amplicon library, an expressed sequence tag (EST) library, a mutant library or a recursively recombined library. Optionally, at least one of the R gene or gene encoding (E) or enzyme catalyzing production of (E) comprise recursively recombined genes. The viral vectors are introduced into cultured **plant** cells, **plant** protoplast, **plant** tissue, isolated **plant** organ, intact **plant** organ or whole **plant**. PDR as described above, or a **plant** disease response, or resistance to infection by a **plant** pathogen, a decrease in symptoms of an infection or a reduction in pathogen growth is detected to identify a functional interaction between R gene and (E). In (M4), the **plant** cell is exposed to *Pseudomonas* sp.. The R gene involved in the method is a member of genomic library, an expression library, a DNA library, a PCR amplicon library, EST library, a mutant library or a recursively recombined library. The product of the R gene is translocated from the pathogen to the **plant** cell by a secretory system of the pathogen which comprises a type III secretory system, and the R gene segment further comprises a targeting signal as described above. In (M5), the RNA viral vectors are introduced by:

- (a) inoculating the cell with infectious viral transcripts; or
- (b) by introducing several cDNA molecules corresponding to viral transcripts.

The viral transcripts comprise the several cDNA molecules which are produced in the cytoplasm of the cell. The cDNA molecules are introduced by electroporation, microinjection, biolistics, *Agrobacterium*-mediated transformation or agroinfection. The RNA viral vector comprises a **plant** viral vector, e.g. tobamovirus, potyvirus, tobnavirus, potexvirus, or comprises tobacco mosaic virus (TMV), a TMV homolog, or an engineered viral vector derived from TMV or TMV homolog. The viral vectors comprise a protein coding sequence and are introduced into a isolated **plant** cell, a protoplast, a **plant** explant, a **plant** tissue, or an intact **plant**. The method involves growing the **plant** cell or intact **plant** comprising the **plant** cell, in a suspension culture. Cytoplasmic recombination is mediated by template switching of an RNA polymerase expressed by the cell. The RNA polymerase is a **plant** viral RNA polymerase, or a mutant or engineered viral RNA polymerase that enhances the frequency of homologous or non-homologous RNA recombination relative to a wild-type **plant** viral RNA polymerase. The mutant R gene engineered viral RNA polymerase is by a directed evolution process e.g., a DNA or RNA recombination procedure. The method further involves recovering recombinant viral vector by isolating RNA from the cell, and identifying the RNA viral vector comprising a gene with desired property by selection or screening. The method preferably involves introducing a first and second RNA viral vectors incapable of systemic infection in a **plant**, which first and second viral vectors have complementary mutations in genes essential for systemic infection, and identifying a recombinant RNA viral vector by selecting or screening for RNA viral vectors capable of systemic infection. The selection or screening is performed by sampling a **plant** cell or tissue remote from the

site of introduction. The first and second viral vectors have complementary mutations in one or more of a gene encoding a viral movement protein or viral coat protein.

Preferred Bio-detector: (II) comprises R gene which is recursively recombined and has a specified characteristic. The R gene encodes a product capable of activation by a designated (E) such as Avr gene product. The reporter is green fluorescent protein, a carotenoid biosynthetic enzyme, an anthocyanin regulatory gene or a luciferase. The reporter is operably linked to a promoter derived from a gene in SAR pathway or to a promoter comprising a pathogenesis-related (PR) gene promoter.

Preferred Plant Cell: One or more components of (II) is stably integrated into a chromosome of (III), or are extrachromosomally replicated. The extrachromosomally replicated component of (II) comprises a non-integrating viral vector.

L18 ANSWER 4 OF 21 WPIDS (C) 2003 THOMSON DERWENT
AN 2001-590177 [66] WPIDS
DNN N2001-439566 DNC C2001-175137
TI New **plant** pathogen hypersensitive response **elicitor**
~~receptor~~ **protein** isolated from **plants**, which upon
silencing is used to study **plant** signal transduction pathways
leading to disease resistance and growth enhancement.
DC C06 D16 P13 S03
IN FAN, H; SONG, X; WEI, Z
PA (EDEN-N) EDEN BIOSCIENCE CORP; (FANH-I) FAN H; (SONG-I) SONG X; (WEIZ-I)
WEI Z
CYC 94
PI WO 2001070988 A2 20010927 (200166)* EN 78p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM
DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC
LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE
SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
AU 2001047562 A 20011003 (200210)
US 2002007501 A1 20020117 (200212)
ADT WO 2001070988 A2 WO 2001-US8728 20010319; AU 2001047562 A AU 2001-47562
20010319; US 2002007501 A1 Provisional US 2000-191649P 20000323,
Provisional US 2000-250710P 20001201, US 2001-810997 20010316
FDT AU 2001047562 A Based on WO 200170988
PRAI US 2000-250710P 20001201; US 2000-191649P 20000323; US 2001-810997
20010316
AB WO 200170988 A UPAB: 20011113
NOVELTY - An isolated **protein** (I) which serves as a receptor in
plants for **plant** pathogen hypersensitive response
elicitors (HRE), is new.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the
following:
(1) an isolated nucleic acid molecule (II) encoding (I);
(2) an antisense nucleic acid molecule (III) to (II);
(3) an expression vector (IV) comprising (II) which is heterologous
to the expression vector;
(4) an expression vector containing (III) which is heterologous to
the expression vector;
(5) a transgenic host cell (V) transformed with (II);
(6) a host cell transformed with (III);
(7) a transgenic **plant** (VI) transformed with (II);
(8) a transgenic **plant** transformed with (III);
(9) a transgenic **plant** seed (VII) transformed with (II);

- (10) a transgenic **plant** seed transformed with (III);
- (11) enhancing (M1) **plant** receptivity to treatment with HRE which involves providing (VI) or (VII);
- (12) imparting (M2) disease resistance, enhancing growth, controlling insects and/or imparting stress resistance to **plants** involves providing transgenic **plant** or **plant** seed transformed with a DNA construct effective to silence expression of (II); and
- (13) imparting (M3) disease resistance, enhancing growth controlling insects and/or imparting stress resistance to **plants** involves providing transgenic **plant** or **plant** seed transformed with (II).

ACTIVITY - Virucide; fungicide; antibacterial. HrBP1 was over-expressed in tobacco **plants** under the control of an NOS promoter. When infiltrated with purified harpin, the transgenic lines developed HR much faster than wild type **plants**. The HrBP1 over-expressing lines were about 20-30% taller than wild-type Xanthi NN **plants**. 61-day-old wild type and hypersensitive response elicitor binding **protein** 1 (HrBP1) over-expressing Xanthi NN tobacco **plants** were inoculated with tobacco mosaic virus (TMV) by rubbing TMV with diatomaceous earth on the upper surface of leaves. Lesions appeared 2 days after manual inoculation. The diameter of disease spots was measured. On average, the diameter of lesions on transgenic **plant** leaves were 33.4% less than that on wild type **plants**. Therefore, the surface area of lesions on transgenic **plant** leaves was about 44.3% of those of the wild type **plants**.

MECHANISM OF ACTION - Positive regulator of the **plant** signal transduction pathway for growth and disease resistance.

USE - (I) is useful for identifying agents targeting **plant** cells which involves forming a reaction mixture comprising (I) and a candidate agent, evaluating the reaction mixture for binding between the **protein** and the candidate agent and identifying candidate agents which bind to the **protein** in the reaction mixture as **plant** cell targeting agents. (V) is useful for identifying agents targeting **plant** cells which involves forming a reaction mixture comprising (V) and a candidate agent, evaluating the reaction mixture for binding between the **protein** produced by the host cell and a candidate agent and identifying candidate agents which bind to the **protein** produced by the host cell in the reaction mixture as **plant** cell targeting agents. By (M1) and (M3), disease resistance, enhanced **plant** growth, control of insects and stress tolerance are imparted to the **plants**. HRE treatment to the **plants** in (M1) enhances **plant** growth, imparts disease resistance, controls insects and imparts stress tolerance (all claimed). (I) can be used as a novel way to screen for new inducers of **plant** resistance against insect, disease and stress and of growth enhancement. The **protein** is useful for understanding the harpin (*Erwinia amylovora* hypersensitive response elicitor) induced signal transduction pathway in **plants**. (M2) is useful for studying the downstream components of signal transduction pathway in **plants** which eventually leads to disease resistance, growth enhancement, insect control and stress resistance. By (M1) and (M3), the **plants** are made resistant to infection by viruses, bacteria and fungi, and are imparted with resistance against environmental stress and insects.

ADVANTAGE - Imparting disease resistance to **plants** through HRE treatment has the potential to treat previously untreatable diseases, treating diseases systemically which might not be treated separately due to cost, and avoids the use of infectious agents or environmentally harmful materials. By HRE treatment enhanced **plant** growth is

achieved which includes greater yield, increased quantity of seeds produced, increased percentage of seeds germinated, increased **plant** size, greater biomass, more and bigger fruits, etc., which results in economic benefit to cultivators. Greater yield, increased size and enhanced biomass allow greater revenue generation from the given plot of **plant**.

Dwg.0/12

TECH

UPTX: 20011113

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Protein: (I) serves as a receptor for HRE from **plant** pathogens such as *Erwinia*, *Pseudomonas*, *Xanthomonas*, *Phytophthora* or *Clavibacter*. Preferably, (I) is a receptor for HRE from *E. amylovora*. (I) is preferably from a monocot such as rice or from a dicot such as *Arabidopsis thaliana*.

Preferred Nucleic Acid: (II):

(a) hybridizes to a fully defined sequence of 613 nucleotides (S5) under stringent conditions;

(b) has a nucleotide sequence of (S5);

(c) hybridizes to the fully defined sequence of 1000 nucleotides (S2) or 205 nucleotides (S9) as given in specification;

(d) has a nucleotide sequence of (S2);

(e) hybridizes to a fully defined sequence of 4260 nucleotides (S3) as given in the specification under stringent conditions; or

(f) has a sequence of (S3).

Preferred Expression Vector: In (IV), (II) is positioned in sense orientation and correct reading frame.

Preferred Host Cell: (V) is a **plant** or bacterial cell, where the DNA molecule is transformed with an expression system.

Preferred Transgenic **Plant**: (VI) or (VII) is a alfalfa, rice, wheat, barley, rye, cotton, sunflower, peanut, corn, potato, sweet potato, bean pea, chicory, lettuce, endive, cabbage, brussel sprout, beet, parsnip, cauliflower, broccoli, turnip, radish, spinach, onion, garlic, eggplant, pepper, celery, carrot, squash, pumpkin, zucchini, cucumber, apple, pear, melon, citrus, strawberry, grape, raspberry, pineapple, soybean, tobacco, tomato, sorghum, and sugarcane. Preferably, (VI) is *A. thaliana*, *Saintpaulia*, *petunia*, *pelargonium*, *poinsettia*, *chrysanthemum*, *carnation*, or *zinnia*.

Preferred Method: In (M1) and (M2), preferably, (VI) is provided, and if (VII) is provided the method further involves planting the **plant** seeds under conditions such that the **plants** grow from the planted seeds. The method further involves providing HRE treatment for imparting disease resistance, enhancing **plant** growth, controlling insects, or for imparting stress tolerance to the **plants**. Preferably, (VI) or (VII) is further transformed with a second nucleic acid encoding HRE, where expression of the second nucleic acid affects the HRE treatment. In (M2), the DNA construct is (III), or is transcribable to a first nucleic acid encoding a receptor in **plants** for **plant** pathogen HRE coupled to second nucleic acid encoding inverted complement of first nucleic acid. In (M3), preferably, (VI) is provided, and if (VII) is provided the method further involves planting the **plant** seeds under conditions such that the **plants** grow from the planted seeds.

L18 ANSWER 5 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 2001-488791 [53] WPIDS

DNN N2001-361641 DNC C2001-146752

TI New chimeric gene, useful for controlling **plant**-pathogenic fungi and producing oomycete-resistant transgenic **plants**, comprises first DNA encoding hypersensitive response elicitor, promoter and regulatory region.

DC C06 D16 P13
 IN BAUER, D W; BEER, S V
 PA (CORR) CORNELL RES FOUND INC; (BAUE-I) BAUER D W; (BEER-I) BEER S V
 CYC 94
 PI WO 2001055347 A1 20010802 (200153)* EN 73p
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
 NL OA PT SD SE SL SZ TR TZ UG ZW
 W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM
 DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC
 LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE
 SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
 AU 2001033007 A 20010807 (200174)
 US 2002069434 A1 20020606 (200241)
 ADT WO 2001055347 A1 WO 2001-US2579 20010126; AU 2001033007 A AU 2001-33007
 20010126; US 2002069434 A1 Provisional US 2000-178565P 20000126, US
 2001-770693 20010126
 FDT AU 2001033007 A Based on WO 200155347
 PRAI US 2000-178565P 20000126; US 2001-770693 20010126
 AB WO 200155347 A UPAB: 20010919
 NOVELTY - A chimeric gene comprising:
 (a) a first DNA molecule encoding a hypersensitive response
elicitor protein or polypeptide;
 (b) a promoter operably linked 5' to the first DNA molecule to induce
 transcription of the first DNA molecule in response to activation of the
 promoter by an oomycete; and
 (c) a 3' regulatory region operably linked to the first DNA molecule,
 is new.
 DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the
 following:
 (1) an expression system comprising a vector into which the chimeric
 gene is inserted;
 (2) a host cell comprising the chimeric gene;
 (3) a transgenic **plant** resistant to disease resulting from
 oomycete infection comprising the chimeric gene, where the promoter
 induces transcription of the first DNA molecule in response to infection
 of the **plant** by an oomycete;
 (4) making a recombinant **plant** cell comprising transforming
 a **plant** cell with the chimeric gene to yield transcription of
 the first DNA molecule in response to oomycete-induced activation of the
 promoter;
 (5) making a **plant** resistant to disease resulting from
 oomycete infection comprising:
 (a) transforming a **plant** cell with the chimeric gene to
 yield transcription of the first DNA molecule in response to
 oomycete-induced activation of the promoter; and
 (b) regenerating a **plant** from the transformed **plant**
 cell;
 (6) a transgenic **plant** seed obtained from the transgenic
plant; and
 (7) a transgenic **plant** scion or rootstock cultivator
 obtained from the transgenic **plant**.
 ACTIVITY - Antifungal.
 The antifungal properties of the *gst1:hrpN* construct was evaluated.
 The Arabidopsis lines GSSN 8-4 (test **plants** containing the
gst1:hrpN construct), Col-0 WT (wild type, control) and Col-0 EV (empty
 vector, control) were inoculated by drop inoculation with a conidiophore
 suspension (5 X 10 to the power of 4 spores/ml) of *Phytophthora*
parasitica. **Plants** were maintained in a growth chamber (16 hours
 of light, 18 deg. C, 100% humidity) and were scored for infection 10 days
 post inoculation. A rating of 1, 0 conidiophores present, 2, 0-5

conidiophores present, 3, 6-20 conidiophores present on a few leaves, 4, 6-20 conidiophores on all leaves, 5, 20 or more conidiophores on all leaves. Nearly all (29 out of 30) GSSN **plants** were free of any signs of **Phytophthora** *parasitica* and had a disease rating of 1. Trypan blue staining showed that growth of the oomycete was strongly inhibited in GSSN **plants**. Extensive hyphal growth was evident in Col-0 WR and Col-0 EV **plants** with disease ratings of 5 or 4.

MECHANISM OF ACTION - Gene therapy.

USE - The chimeric gene is useful as an effective and safe means of controlling **plant**-pathogenic fungi, particularly oomycetes, which are responsible for major crop loss. The chimeric gene is also useful for producing transgenic **plants** that are resistant to disease resulting from oomycete infection.

Dwg.0/5

TECH

UPTX: 20010919

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Chimeric Gene: The chimeric gene further comprises a second DNA molecule encoding a secretion signal **polypeptide**, where the second DNA molecule is operably linked between the promoter and the first DNA molecule. The second DNA molecule encodes a secretion signal **polypeptide** comprising a sequence having ~~34, 34~~, 30 or 25 amino acids (from *Nicotiana tabacum*) fully defined in the specification. The second DNA molecule comprises a nucleotide sequence of nt 8-110 from a DNA sequence having 110, 102, 90 or 75 base pairs (bp) fully defined in the specification. The promoter is a *gst1* promoter, which comprises a nucleotide sequence having 696 bp (obtained from *Solanum tuberosum*) fully defined in the specification or its fragments. The hypersensitive response **elicitor protein** or **polypeptide** is derived from a species of pathogen selected from *Erwinia*, *Xanthomonas*, *Pseudomonas*, *Phytophthora* or *Clavibacter*. The hypersensitive response **elicitor protein** or **polypeptide** may be derived from *Erwinia amylovora*, which comprises a sequence having 403 amino acids fully defined in the specification, and where the first DNA molecule comprises a nucleotide sequence having 1288 bp fully defined in the specification. The hypersensitive response **elicitor protein** or **polypeptide** may also be derived from *E. carotovora*, *E. stewartii* or *E. chrysanthemi*. The hypersensitive response **elicitor protein** or **polypeptide** derived from *E. chrysanthemi* comprises a sequence having 338 amino acids fully defined in the specification, and the first DNA molecule comprises a nucleotide sequence having 2141 bp also fully defined in the specification. The hypersensitive response **elicitor protein** or **polypeptide** is also derived from *Pseudomonas syringae*, where the hypersensitive response **elicitor protein** or **polypeptide** has a sequence comprising 341 amino acids fully defined in the specification, and the first DNA molecule comprises a nucleotide sequence having 1026 bp fully defined in the specification. The hypersensitive response **elicitor protein** or **polypeptide** may also be derived from *P. solanacearum* and comprises a sequence having 344 amino acids fully defined in the specification, where the first DNA molecule has a nucleotide sequence comprising 1035 bp also fully defined in the specification. The chimeric gene is stably inserted into the genome of the transgenic **plant**. Preferred Cell: The host cell is a bacterial cell or **plant** cell. In particular, the bacterial cell is an *Agrobacterium* cell. The oomycete is a species of *Plasmopara*, *Phytophthora*, *Peronospora*, *Pseudoperonospora*, *Bremia*, *Sclerospora*, *Aphanomyces*, *Pythium* or *Albugo*. Preferably the oomycete is *Plasmopara viticola* or *Phytophthora parasitica*. The oomycete may also be *Peronospora tabacina*, *Pythium* spp. or *Phytophthora* spp.

Preferred Plant: The transgenic **plant** is selected from rice, wheat, barley, rye, cotton, sunflower, peanut, corn, potato, sweet potato, bean, pea, chicory, lettuce, endive, cabbage, cauliflower, broccoli, turnip, radish, spinach, onion, garlic, eggplant, pepper, celery, carrot, squash, pumpkin, zucchini, cucumber, apple, pear, melon, strawberry, grape, raspberry, pineapple, soybean, tobacco, tomato, sorghum and sugarcane. Preferably, the transgenic **plant** is a grape **plant**. The transgenic **plant** may also be a tobacco **plant**.

Preferred Method: In the method (5), transforming is performed under conditions effective to insert the chimeric gene into the genome of the **plant** cell. Preferably, the transforming step is Agrobacterium mediated, and comprises:

- (a) propelling particles at the **plant** cell for the particles to penetrate into the cell interior; and
- (b) introducing the expression vector comprising the chimeric gene into the **plant** cell interior.

L18 ANSWER 6 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 2001-308571 [32] WPIDS

DNC C2001-095348-

TI Stimulating natural defenses of **plants**, especially against fungal or bacterial infections, by application of **plant** extract containing enzymes and/or other peptides.

DC C03 D16

IN BONINI, N

PA (GITE-N) GITEN GRP SA

CYC 23

PI WO 2001030161 A1 20010503 (200132)* FR 18p

RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE

W: AU BR NZ US ZA

AU 9963466 A 20010508 (200149)

ADT WO 2001030161 A1 WO 1999-FR2610 19991025; AU 9963466 A AU 1999-63466 19991025, WO 1999-FR2610 19991025

FDT AU 9963466 A Based on WO 200130161

PRAI WO 1999-FR2610 19991025

AB WO 200130161 A UPAB: 20010611

NOVELTY - Stimulating the natural defenses of **plants**, by production of phytoalexins and peroxidases under the action of **elicitors**, involves applying (to the foliage or leaves or by injection) a mixture of **plant** extracts containing at least one **protein** (I) selected from proteases, lipases, pectinases, beta-1,3-glucanases, xylanases, galactanases, mannanases, chitinases and non-enzyme **peptides**.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for the use of (I) for stimulating the natural defences of **plants**, where (I) is formulated with conventional agricultural supports or carriers of the wetting/penetrating type,

ACTIVITY - Fungicidal; bactericidal.

MECHANISM OF ACTION - Natural defense mechanism stimulant, phytoalexin and peroxidase production stimulant.

A solution of a protease obtained from the sap or skin of Euphorbiaceae fruit was applied to the leaves of 15 day old melon **plants**. The peroxidase activity was increased 6-fold compared with that in control **plants** treated with water.

USE - (I) is specifically applied to vines, to prevent attack by oidium, mildew, Botrytis, wood diseases or soil disease; fruit trees, especially pear or apple trees, to prevent attack by oidium, spot, Monilia or bacterial diseases; cereals, especially wheat, maize or rice, to prevent attack by oidium, Septoria, rusts, Fusarium, Pyricularia or

bacterial diseases; oleaginous **plants**, especially soya, sunflower or rape, to prevent attack by oidium, Phoma or bacterial diseases; leguminous **plants**, especially tomatoes, melons, carrots, cauliflower or potatoes, to prevent attack by **Phytophthora**, Pythium, Rhizoctonia, Sclerotinia, Pyrenochaeta, Fusarium, Verticillium and bacterial diseases; or turf or horticultural **plants**, to prevent attack by **Phytophthora**, Pythium, Rhizoctonia, Sclerotinia, Pyrenochaeta, Fusarium, oidium and bacterial diseases (all claimed).

ADVANTAGE - (I) stimulates the natural defense mechanism of **plants** and increases the effectiveness of **plant** protectants already present.

Dwg.0/0

TECH

UPTX: 20010611

TECHNOLOGY FOCUS - AGRICULTURE - Preferred Components: The non-enzymatic peptide contains at least 2 amino acid residues. The composition contains at least one hydrolase enzyme or at least one non-enzyme peptide.

L18 ANSWER 7 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 2001-308570 [32] WPIDS

DNC C2001-095347

TI Stimulating natural defenses of **plants**, especially against fungal or bacterial infections, by application of fungal or bacterial enzymes and/or other peptides.

DC C03 D16

IN BACOU, J C; BESNARD, O; MARTINEZ, C

PA (MYCO-N) MYCOS SARL

CYC 36

PI WO 2001030160 A1 20010503 (200132)* FR 19p

RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE

W: AU BR CA CN HU IL IN JP MA MX NZ PL RO RU TR US YU ZA

FR 2799935 A1 20010427 (200132)

AU 2001010347 A 20010508 (200149)

ADT WO 2001030160 A1 WO 2000-FR2970 20001025; FR 2799935 A1 FR 1999-13483 19991025; AU 2001010347 A AU 2001-10347 20001025

FDT AU 2001010347 A Based on WO 200130160

PRAI FR 1999-13483 19991025

AB WO 200130160 A UPAB: 20010611

NOVELTY - Stimulating the natural defenses of **plants**, by production of phytoalexins and peroxidases under the action of **elicitors**, involves applying (to the foliage or leaves or by injection) at least one **protein** (I) selected from proteases, lipases, pectinases, beta-1,3-glucanases, xylanases, galactanases, mannanases, chitinases and non-enzyme **peptides**, produced by fungal or bacterial microorganisms.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for the use of (I) for stimulating the natural defenses of **plants**, where (I) is formulated with conventional agricultural supports or carriers of the wetting/penetrating type,

ACTIVITY - Fungicidal; bactericidal.

MECHANISM OF ACTION - Natural defense mechanism stimulant; phytoalexin and peroxidase production stimulant.

A solution of a cellulase obtained from the fungal strain *Trichoderma harzianum* A1 (5 U/ml) was applied to the leaves of 15 day old melon **plants**. The peroxidase activity was increased 5-fold compared with that in control **plants** treated with water.

USE - (I) is specifically applied to vines, to prevent attack by oidium, mildew, Botrytis, wood diseases or soil disease; fruit trees, especially pear or apple trees, to prevent attack by oidium, spot, Monilia or bacterial diseases; cereals, especially wheat, maize or rice, to

prevent attack by oidium, Septoria, rusts, Fusarium, Pyricularia or bacterial diseases; oleaginous **plants**, especially soya, sunflower or rape, to prevent attack by oidium, Phoma or bacterial diseases; leguminous **plants**, especially tomatoes, melons, carrots, cauliflower or potatoes, to prevent attack by **Phytophthora**, Pythium, Rhizoctonia, Sclerotinia, Pyrenochaeta, Fusarium, Verticillium and bacterial diseases; or turf or horticultural **plants**, to prevent attack by **Phytophthora**, Pythium, Rhizoctonia, Sclerotinia, Pyrenochaeta, Fusarium, oidium and bacterial diseases (all claimed).

ADVANTAGE - As well as stimulating the natural defense mechanism of **plants**, (I) increases the effectiveness of **plant** protectants already present.

Dwg.0/0

TECH

UPTX: 20010611

TECHNOLOGY FOCUS - AGRICULTURE - Preferred Components: The non-enzymatic peptide contains at least 2 amino acid residues. The composition contains at least one hydrolase enzyme or at least one non-enzyme peptide.

L18 ANSWER 8 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 2001-007224 [01] WPIDS

DNN N2001-005166 DNC C2001-001839

TI DNA molecules that encode **proteins** that bind to general **elicitors**, to inhibit growth when applied to **plants** or **plant** cells.

DC C06 D16 P13

IN BOLLER, T; FELIX, G; GOMEZ, L

PA (SYNG-N) SYNGENTA PARTICIPATIONS AG; (NOVS) NOVARTIS AG; (NOVS) NOVARTIS-ERFINDUNGEN VERW GES MBH

CYC 92

PI WO 2000066740 A1 20001109 (200101)* EN 54p

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SL SZ TZ UG ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM DZ
EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK
LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI
SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

AU 2000050636 A 20001117 (200111)

ADT WO 2000066740 A1 WO 2000-EP3924 20000502; AU 2000050636 A AU 2000-50636 20000502

FDT AU 2000050636 A Based on WO 200066740

PRAI GB 1999-10965 19990504

AB WO 200066740 A UPAB: 20001230

NOVELTY - A DNA molecule (I) encoding a **protein** capable of binding to a general **elicitor** (III), is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) a DNA (Ia) encoding a protein having at least 40% identity to a fully defined sequence of 1173 amino acids;

(2) a protein (II) encoded by (I) or (Ia);

(3) a DNA sequence (Ib) encoding a protein of structure (X)_n-R-(X)_m, where X is any amino acid, n and m independently designate any number between 0 and 1000, and R defines a protein component of 15 amino acids having 60% or more identity with sequence RINSAKDDAAGLQIA;

(4) a protein (IIa) encoded by (Ib);

(5) an expression cassette (IV) comprising (I), (Ia) or (Ib), operably linked to a promoter for expression in host organisms such as a microorganism or **plant**, and optionally to a transcriptional terminator;

(6) a host organism (V) with (I), (Ia), (Ib) or (IV) stably

integrated into its genome;

(7) a **plant** or progeny comprising (I), (Ia), (Ib) or (IV) stably integrated into its genome;

(8) a growth inhibitory composition comprising (IIa); and

(9) protecting **plants** against pests by expressing (I), (Ia) and/or (Ib) in the **plant**.

ACTIVITY - None given.

MECHANISM OF ACTION - **Plant** growth inhibitor; **plant** defense response inducer.

Arabidopsis thaliana seeds of ecotypes Ao-0, Col-0, La-er, Nd-0 and Ws-0 were vernalized prior to germination. For growth in soil, seeds were germinated and grown in growth chambers. Seedlings grown for 5 days on MS (Murashige Skoog) agar plates were transferred to liquid MS medium supplied with different proteins. The effect of treatment with different proteins on seedling growth was analyzed after 7 to 14 days by weighing (fresh weight). Addition of the flagellin-derived protein flg22 to the liquid medium of young *A. thaliana* seedlings caused a strong reduction in growth. Treatment with flg22 affected growth of roots, leaves and cotyledons. Consequently, the treatment also resulted in strong reduction in fresh weight increase. The inhibitory effect was dose-dependent, and a concentration of 100 nM flg22 caused half-maximal growth reduction. Prolonged incubation of the seedlings in the presence of flg22 resulted in dwarf **plants** but the seedlings remained green and did not show necrosis.

USE - (I), (Ia), (Ib), (II), (IIa) and compositions comprising (IIa), are useful for inhibiting growth of **plants** such as maize, sugar beet, cotton, rice, wheat, barley, sorghum, tomato, melon, pepper and Brassica, or **plant** cells by direct or indirect application. (I), (Ia) or (Ib) is useful for protecting **plant** against pests.

ADVANTAGE - (IIa) causes at least 75% growth inhibition when applied in 10 micro M concentration for 7 days to 5 day old seedlings of *Arabidopsis thaliana* ecotype Col-0.
Dwg.0/0

TECH

UPTX: 20001230

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Sequence: (III) comprises a domain having 60% or more, preferably 93% amino acid sequence identity with the amino terminal sequence of flagellin protein from *Pseudomonas aeruginosa* comprising sequence RINSAKDDAAGLQIA. The nucleotide composition is optimized for expression in monocots. The 15 amino acid protein component of (Ib) has S in position 4, D in position 7 and/or 8, and G in position 11. The protein further comprises a basic amino acid in position 1, a non-polar amino acid in position 2, 9, 12, 13 or 14, an uncharged or non-polar amino acid in position 3, 5, 10 or 15, an uncharged polar, non-polar or basic amino acid in position 4 or 6, and an acidic amino acid in position 8. The protein has R or K in position 1, I in position 2, N, A or L in position 3, S, R, K or A in position 4, A or S in position 5, K, A, G, S or L in position 6, D in position 7 and 8, A in position 9, A or S in position 10, G in position 11, L, Q or N in position 12, Q, A, G, F or T in position 13, I or V in position 14 and A, S or V in position 15. The protein component is preceded by sequence NH₂-N1-Leu-N2-N3-Gly-N4-COOH, where N1 is R or K, N2 is S or A, N3=T or S, and N4=S, L, K or Y.

L18 ANSWER 9 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 2000-620215 [60] WPIDS

DNC C2000-185943

TI Deoxyribonucleic acid fragment for identifying homologues capable of promoting pathogen-induced transcription is obtained from a **plant** specie.

DC B04 C06 D13 D16 D17 F09

IN CUSTERS, J H H V; MELCHERS, L S; CUSTERS, J
 PA (ZENE) ZENECA MOGEN BV; (MOGE-N) MOGEN INT NV; (SYGN) SYNGENTA MOGEN BV
 CYC 93
 PI EP 1041148 A1 20001004 (200060)* EN 29p
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
 RO SE SI
 WO 2000060086 A1 20001012 (200060) EN
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
 OA PT SD SE SL SZ TZ UG ZW
 W: AE AG AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM DZ
 EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK
 LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI
 SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
 AU 2000043964 A 20001023 (200107)
 EP 1165794 A1 20020102 (200209) EN
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
 RO SE SI
 ADT EP 1041148 A1 EP 1999-201065 19990402; WO 2000060086 A1 WO 2000-EP2619
 20000324; AU 2000043964 A AU 2000-43964 20000324; EP 1165794 A1 EP
 2000-925136 20000324, WO 2000-EP2619 20000324
 FDT AU 2000043964 A Based on WO 2000060086; EP 1165794 A1 Based on WO 2000060086
 PRAI EP 1999-201065 19990402
 AB EP 1041148 A UPAB: 20001123
 NOVELTY - A deoxyribonucleic acid (DNA) fragment from Arabidopsis thaliana
 is capable of promoting pathogen-inducible transcription of an associated
 DNA sequence when re-introduced into a **plant**. The DNA fragment
 has nucleotides 1-1728 of a 1782 nucleotide sequence, fully defined in the
 specification.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the
 following:

(1) a chimeric DNA sequence comprising in the direction of
 transcription the novel DNA fragment and a DNA sequence expressed under
 the transcriptional control which is not naturally under the control of
 the DNA fragment;

(2) a replicon comprising the chimeric DNA sequence of (1);

(3) a microorganism containing the replicon of (2);

(4) a **plant** cell comprising the chimeric DNA sequence of
 (1) incorporated into its genome; and

(5) a portion or variant of the novel DNA fragment.

USE - For identifying homologs capable of promoting pathogen-induced
 transcription in a **plant** (claimed). The variant of the DNA
 fragment can be used to make a hybrid regulatory DNA sequence (claimed).
 The chimeric DNA is used to produce transformed pathogen resistant
plants (claimed).

ADVANTAGE - The invention enhances resistance level and the
 production of antipathogenic substances. The **plant** with improved
 resistance against pathogens may be grown in the field, in the green
 house, or at home. **Plants** or its edible parts may be used for
 animal feed or human consumption, or may be processed for food, feed or
 other purposes in any form of agriculture or industry. It also has
 decreased need for biocide treatment, lowering costs of material, labor,
 and environmental pollution.

Dwg.0/6

TECH UPTX: 20001123
 TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Component: The DNA sequence
 causes production of antipathogenic **protein**. The **protein**
 is chitinases, glucanases, osmotins, magainins, lectins, saccharide
 oxidase, oxalate oxidase, oxalate decarboxylase, toxins from Bacillus
 thuringiensis, antifungal **proteins** isolated from Mirabilis
 jalapa, Amaranthus, Raphanus, Brassica, Sinapis, Arabidopsis, Dahlia,

Cnicus, Lathyrus, Clitoria, Allium seeds, Aralia and Impatiens, or albumin-type **proteins**, e.g. thionine, napin, barley trypsin inhibitor, cereal gliadin, or wheat-alpha-amylase. It can induce a hypersensitive response, e.g. Cf, Bs3, and Pto **proteins** from tomato, Rpml and Rps2 from Arabidopsis thaliana, N-**protein** from tobacco, avr **proteins** from Cladosporium fulvum, harpins from **Erwinia** and **elicitor proteins** (avrBs3, avrRpml, avrRpt2) from **Pseudomonas** or **Xanthomonas**.
Preferred Plant: The plant is decotyledonous and consists of cells. It belongs to the Cruciferae family. A part of it is from seeds, flowers, tubers, roots, leaves, fruits, pollen, or wood.

L18 ANSWER 10 OF 21 WPIDS (C) 2003 THOMSON DERWENT
AN 2000-376566 [32] WPIDS
DNC C2000-113968
TI Application of a hypersensitive response **elicitor protein** to **plants** to impart stress resistance.
DC C06 D16
IN SCHADING, R L; WEI, Z
PA (EDEN-N) EDEN BIOSCIENCE CORP
CYC 87
PI WO 2000028055 A2 20000518 (200032)* EN 84p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SL SZ TZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB
GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU
LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR
TT UA UG UZ VN YU ZA ZW
AU 2000016067 A 20000529 (200041)
EP 1124974 A2 20010822 (200149) EN
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI
KR 2001083949 A 20010903 (200217)
ZA 2001003362 A 20020227 (200223) 99p
HU 2001004375 A2 20020328 (200234)
JP 2002529095 W 20020910 (200274) 97p
ADT WO 2000028055 A2 WO 1999-US26039 19991104; AU 2000016067 A AU 2000-16067
19991104; EP 1124974 A2 EP 1999-958773 19991104, WO 1999-US26039 19991104;
KR 2001083949 A KR 2001-705585 20010503; ZA 2001003362 A ZA 2001-3362
20010425; HU 2001004375 A2 WO 1999-US26039 19991104, HU 2001-4375
19991104; JP 2002529095 W WO 1999-US26039 19991104, JP 2000-581221
19991104
FDT AU 2000016067 A Based on WO 200028055; EP 1124974 A2 Based on WO
200028055; HU 2001004375 A2 Based on WO 200028055; JP 2002529095 W Based
on WO 200028055
PRAI US 1998-107243P 19981105
AB WO 200028055 A UPAB: 20000706
NOVELTY - Imparting stress resistance to **plants** comprises
applying a hypersensitive response **elicitor** (HRE)
protein or **polypeptide** in a non-infectious form to a
plant or seed.
DETAILED DESCRIPTION - A INDEPENDENT CLAIM is also included for
providing a transgenic **plant** or seed comprising a DNA molecule
encoding for a HRE protein or polypeptide and growing the **plant**
or **plants** under conditions effective to impart stress
resistance.
USE - The method can be used to impart stress resistance to
plants.
Dwg.0/0
TECH UPTX: 20000706

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Methods: The stress resistance may be imparted by providing a transgenic **plant** or seed transformed with a DNA molecule which encodes the HRE. The HRE **protein** is derived from *Erwinia*, especially *E. amylovora*, *E. carotovora*, *E. chrysanthemi* and *E. stewartii*, *Pseudomonas*, especially *P. syringae* or *P. solanacearum*, *Xanthomonas*, *Phytophthora* or *Clavibacter*, especially *C. michiganensis* *sepedonicus*. Preferably the **plants** are treated during the applying. In particular the (transgenic) seeds are treated during the applying and the method further comprises planting the seeds with the hypertensive response **elicitor protein** or **polypeptide** in natural or artificial soil and propagating **plants** from seeds planted in soil. The stress resistance is chosen from climate related stress (e.g. drought, water, frost, cold or high temperature and excessive or insufficient light), air pollution stress (e.g. CO₂, CO, SO₂, NO_x, hydrocarbons, ozone, ultraviolet radiation and acidic rain), chemical stress (e.g. insecticides, herbicides, fungicides and heavy metals) and nutritional stress (e.g. caused by fertilizers, micronutrients or macronutrients). The **plant** is chosen from 47 species including alfalfa, rice, wheat, etc., or *Arabidopsis thaliana*, *Saintpaulia*, *petunia*, *pelargonium*, *poinsettia*, *chrysanthemum*, *carnation* and *zinnia*.

L18 ANSWER 11 OF 21 WPIDS (C) 2003 THOMSON DERWENT
 AN 2000-328939 [28] WPIDS
 CR 2002-257464 [25]
 DNC C2000-099671
 TI Novel hypersensitive response **elicitor** polynucleotides and **polypeptides** used to improve disease resistance, insect resistance, and growth of **plants**.
 DC C06 D16 P13
 IN FAN, H; SWANSON, S; WEI, Z; SWANSON, S S
 PA (EDEN-N) EDEN BIOSCIENCE CORP; (FANH-I) FAN H; (SWAN-I) SWANSON S S;
 (WEIZ-I) WEI Z
 CYC 88
 PI WO 2000020616 A1 20000413 (200028)* EN 31p
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
 OA PT SD SE SL SZ TZ UG ZW
 W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB
 GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU
 LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR
 TT UA UG UZ VN YU ZA ZW
 AU 9962928 A 20000426 (200036)
 EP 1119632 A1 20010801 (200144) EN
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
 RO SE SI
 ZA 2001002711 A 20020130 (200217) 40p
 HU 2001003789 A2 20020128 (200222)
 US 2002066122 A1 20020530 (200240)
 ADT WO 2000020616 A1 WO 1999-US23265 19991005; AU 9962928 A AU 1999-62928
 19991005; EP 1119632 A1 EP 1999-950223 19991005; WO 1999-US23265 19991005;
 ZA 2001002711 A ZA 2001-2711 20010403; HU 2001003789 A2 WO 1999-US23265
 19991005; HU 2001-3789 19991005; US 2002066122 A1 Provisional US
 1998-103124P 19981005, CIP of US 1999-412452 19991004, Provisional US
 2000-224053P 20000809, US 2001-829124 20010409
 FDT AU 9962928 A Based on WO 200020616; EP 1119632 A1 Based on WO 200020616;
 HU 2001003789 A2 Based on WO 200020616
 PRAI US 1998-103124P 19981005; US 1999-412452 19991004; US 2000-224053P
 20000809; US 2001-829124 20010409
 AB WO 200020616 A UPAB: 20020626

NOVELTY - Isolated *Xanthomonas campestris* hypersensitive response elicitor protein or polypeptide (I), is new.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method of imparting disease resistance to plants, enhancing plant growth, or controlling insects for plants, comprising applying (I) in a non-infectious form to a plant or plant seed.

ACTIVITY - Antifungal; antiviral; antibacterial; insecticide; growth enhancer.

MECHANISM OF ACTION - Hypersensitive response elicitor.

USE - The hypersensitive response elicitor polynucleotides, polypeptides, and methods can be used to impart disease resistance to plants, for enhancing plant growth, and for effecting insect control for plants. The polypeptide may be applied to the plants to produce these effects, or the polynucleotide may be used to produce transgenic plants. Resistance to a wide variety of pathogens is imparted, including viruses, bacteria and fungi, e.g. Tobacco mosaic virus, Tomato mosaic virus, *Pseudomonas solanacearum*, *P. syringae* pv. *Tabaci*, *Xanthomonas campestris* pv. *Pelargonii*, *Fusarium oxysporum*, and *Phytophthora infestans*. The polynucleotides, polypeptides and methods can also be used to increase growth of a plant, e.g. to increase yield and seed production, and produce earlier fruit production and plant maturation. The polynucleotides, polypeptides and methods are also effective against a wide variety of insects, such as European corn borer, beet armyworm, cabbage looper, corn ear worm, fall armyworm, diamondback moth, cabbage root maggot, onion maggot, seed corn maggot, pickleworm, pepper maggot, tomato pinworm, and maggots. Plants which can be untreated include both dicots and monots, such as cereals, rice, vegetables, and ornamental plants.

ADVANTAGE - The polynucleotides, polypeptides and methods may be used to treat previously untreatable diseases, or for treating diseases systemically which might not have been treated with prior art methods due to cost. The invention also avoids the use of infectious agents or environmentally harmful agents.

Dwg.0/0

TECH

UPTX: 20000613

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Peptide: (I) which has a molecular weight of 13-15 kDa, and has the amino acid sequence of (Ia). Met-Asp-Glu-Ile-Glu-Asn-His-Phe-Ser-Asn (Ia)

Preferred Method: The plants are treated during the application of the peptide. The method further comprises planting the treated seeds in natural or artificial soil, and propagating plants from the planted seeds.

L18 ANSWER 12 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 2000-303745 [26] WPIDS

DNN N2000-226915 DNC C2000-092264

TI Hypersensitive response elicitor polypeptides useful for imparting enhanced growth, disease resistance and insect resistance to plants, especially vegetables and ornamental flowers.

DC C06 D16 P13

IN FAN, H; NIGGEMEYER, J L; WEI, Z

PA (EDEN-N) EDEN BIOSCIENCE CORP

CYC 87

PI WO 2000020452 A2 20000413 (200026)* EN 99p

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SL SZ TZ UG ZW

W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB

GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU
LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR
TT UA UG UZ VN YU ZA ZW

AU 9965085 A 20000426 (200036)

NO 2001001729 A 20010605 (200138)

EP 1119582 A2 20010801 (200144) EN

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI

BR 9915345 A 20010731 (200146)

KR 2001080011 A 20010822 (200213)

ZA 2001002536 A 20020227 (200223) 120p

CN 1329619 A 20020102 (200227)

HU 2001004245 A2 20020328 (200234)

JP 2002526101 W 20020820 (200258) 112p

ADT WO 2000020452 A2 WO 1999-US23181 19991005; AU 9965085 A AU 1999-65085
19991005; NO 2001001729 A WO 1999-US23181 19991005, NO 2001-1729 20010405;
EP 1119582 A2 EP 1999-953057 19991005, WO 1999-US23181 19991005; BR
9915345 A BR 1999-15345 19991005, WO 1999-US23181 19991005; KR 2001080011
A KR 2001-704332 20010404; ZA 2001002536 A ZA 2001-2536 20010328; CN
1329619 A CN 1999-814028 19991005; HU 2001004245 A2 WO 1999-US23181
19991005, HU 2001-4245 19991005; JP 2002526101 W WO 1999-US23181 19991005,
JP 2000-574563 19991005.

FDT AU 9965085 A Based on WO 200020452; EP 1119582 A2 Based on WO 200020452;
BR 9915345 A Based on WO 200020452; HU 2001004245 A2 Based on WO
200020452; JP 2002526101 W Based on WO 200020452

PRAI US 1998-103050P 19981005

AB WO 200020452 A UPAB: 20000531

NOVELTY - An isolated fragment of a hypersensitive response
elicitor polypeptide (I), which does not elicit a
hypersensitive response but has other activity in **plants**, is
new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the
following:

- (1) an isolated DNA molecule (II) encoding (I);
- (2) an expression system (III) transformed with (II);
- (3) a host cell (IV) transformed with (II);
- (4) a transgenic **plant** (V) transformed with (II);
- (5) a transgenic seed (VI) transformed with (II);
- (6) a method (VII) of imparting disease resistance to a **plant**
comprising applying (I) (which does not elicit a hypersensitive response)
in a non-infectious form to a **plant** or seed under conditions
that will impart disease resistance;
- (7) a method (VIII) of enhancing **plant** growth, comprising
applying (I) (which does not elicit a hypersensitive response) in a
non-infectious form to a **plant** or seed under conditions that
will impart enhanced growth;
- (8) a method (IX) of insect control for insects comprising applying
(I) (which does not elicit a hypersensitive response) in a non-infectious
form to a **plant** or seed under conditions that will effectively
control insects; and
- (9) **plants** and seeds produced by (VII), (VIII) and/or (IX).

ACTIVITY - Antimicrobial; growth stimulant; insecticidal.

C-terminal fragments of (I) enhanced the growth of tomato by 9-21%,
N-terminal fragments enhanced growth by 4-13% and internal fragments
enhanced growth by 9-20%.

MECHANISM OF ACTION - Elicitor; gene therapy.

USE - (I) may be used to impart disease resistance, enhanced growth
and/or insect control characteristics to **plants**. The
plants which may be treated in this way include vegetables, crops
and ornamental **plants** such as alfalfa, rice, wheat, barley, rye,

cotton, sunflower, peanut, corn, potato, sweet potato, bean, pea, chicory, lettuce, endive, cabbage, brussel sprout, beet, parsnip, turnip, cauliflower, broccoli, radish, spinach, onion, garlic, eggplant, pepper, celery, carrot, squash, pumpkin, zucchini, cucumber, apple, pear, melon, citrus, strawberry, grape, raspberry, pineapple, soybean, tobacco, tomato, sorghum or sugarcane, Arabidopsis thaliana, Saintpaulia, petunia, pelargonium, poinsettia, chrysanthemum, carnation or zinnia (claimed).
Dwg.0/2

TECH

UPTX: 20000531

TECHNOLOGY FOCUS - BIOLOGY - Isolation: (I) is isolated from an **Erwinia** (especially *E. amylovora*), **Pseudomonas** (especially *P. syringae*), **Xanthomonas** or **Phytophthora**.

Preferred **Plants**: (V) and (VI) are preferably alfalfa, rice, wheat, barley, rye, cotton, sunflower, peanut, corn, potato, sweet potato, bean, pea, chicory, lettuce, endive, cabbage, brussel sprout, beet, parsnip, turnip, cauliflower, broccoli, radish, spinach, onion, garlic, eggplant, pepper, celery, carrot, squash, pumpkin, zucchini, cucumber, apple, pear, melon, citrus, strawberry, grape, raspberry, pineapple, soybean, tobacco, tomato, sorghum or sugarcane. Additionally, the **plant** and seed may be *Arabidopsis thaliana*, *Saintpaulia*, *petunia*, *pelargonium*, *poinsettia*, *chrysanthemum*, *carnation* or *zinnia*.

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred **Polypeptides**: If the **elicitor** is derived from *E. amylovora*, (I) is preferably a C-terminal fragment of a defined 403 amino acid sequence (Ix) given in the specification, an N-terminal fragment of (Ix) or an internal fragment of (Ix). The C-terminal fragment comprises amino acids 169-403, 210-403, 267-403 or 343-403 of (Ix). The internal fragment comprises amino acids 105-179, 137-166, 121-150 or 137-156 of (Ix). If the **elicitor** is derived from *P. syringae*, (I) preferably comprises amino acids 190-294 of a defined 341 amino acid sequence (Iy) given in the specification.

Preferred Nucleic Acids: In (III), (II) is positioned in the proper sense orientation and correct reading frame.

Preferred Cells: (IV) is preferably a **plant** cell or a bacterial cell. (II) is preferably transformed with an expression system (i.e. (III)).

Preferred Methods: In (VII), (VIII) and (IX), the **plants** are treated during application. (VII), (VIII) and (IX) further comprise planting the seeds treated with (I) in natural or artificial soil and propagating **plants** from the seeds in the soil. Preferably, (VII), (VIII) and (IX) comprise:

(A) producing a transgenic **plant** or seed transformed with (II);
and

(B) growing the transgenic **plants** or seeds under conditions that impart disease resistance, enhanced growth and/or insect control.

Preparation: (I) and the nucleic acids (II) that encode it may be produced according to standard methodologies.

L18 ANSWER 13 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 2000-293162 [25] WPIDS

DNC C2000-088685

TI Inducing resistance to vascular wilt disease in **plants** using elicitors derived from fungus implicated in the pathogenesis of Dutch Elm Disease.

DC C04 D16

IN HUBBES, M

PA (UTOR) UNIV TORONTO GOVERNING COUNCIL

CYC 90

PI WO 2000018928 A1 20000406 (200025)* EN 31p

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL

OA PT SD SE SL SZ TZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES
FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS
LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ
TM TR TT UA UG US UZ VN YU ZA ZW

AU 9958440 A 20000417 (200035)

EP 1115869 A1 20010718 (200142) EN

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI

ADT WO 2000018928 A1 WO 1999-CA884 19990927; AU 9958440 A AU 1999-58440
19990927; EP 1115869 A1 EP 1999-945798 19990927, WO 1999-CA884 19990927

FDT AU 9958440 A Based on WO 200018928; EP 1115869 A1 Based on WO 200018928

PRAI US 1998-160246 19980925

AB WO 200018928 A UPAB: 20000524

NOVELTY - A method (I) for inducing resistance to vascular wilt disease in a susceptible **plant**, comprising administering an elicitor (or fragment or analogue) obtained from a Dutch Elm Disease (DED)-causing fungus, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (1) an isolated nucleic acid (II) comprising a sequence encoding a glycoprotein elicitor obtained from a DED-causing fungus;
- (2) a vector (III) comprising (II);
- (3) a host cell comprising (III);
- (4) a purified protein (IV) comprising an amino acid sequence with at least 70% homology to a defined sequence given in the specification (or a fragment); and
- (5) a method of preparing a glycoprotein elicitor, comprising culturing *Ophiostoma ulmi* fungus and harvesting the glycoprotein elicitor from the culture filtrate.

ACTIVITY - Fungicidal.

MECHANISM OF ACTION - Vaccine, it has been shown previously (see Patent Number CA9800284) that the DED-producing fungus *Ophiostoma ulmi* produces elicitor compounds that can elicit a defence reaction in elm trees and the trees produce compounds inhibitory to the fungus and are therefore able to resist infection. It has now been found that this glycoprotein can be useful in stimulating resistance to other diseases.

Golden delicious apples seedlings were grown in a greenhouse and treated by injection (20 microliters), at the seventh leaf below the apex, with 2 micrograms/20 microliters of *O. ulmi* Q412 elicitor (negative control). 7 Days after treatment, the treated seedlings and a group of untreated positive controls were challenged by injecting an aggressive strain of *Erwinia amylovora* at the apex leaf (20 microliters inoculant containing 200000 bacteria). 2 Weeks after challenge with the bacteria, disease symptoms were rated on a disease index scale (as described in the specification). It was found that 100% of the negative controls were undiseased, compared to 100% of the positive controls that were diseased.

USE - (I) is used for inducing resistance to vascular wilt disease in a susceptible **plant** such as a tree, woody perennial **plant** or non-woody **plant**, especially fruit trees such as apple and pear trees. The wilt disease treated is caused by *Verticillium* spp., *Ceratocystis fagacearum*, *Fusarium* spp.. In particular (I) is used to induce resistance to Fire Blight Disease (caused by *Erwinia amylovora*) in members of the Rosaceae family (claimed) such as the genera *Malus* (apples), *Pyrus* (pears) *Prunus* (apricots, cherries and plums), and *Rosa* (roses).

Dwg.0/0

TECH

UPTX: 20000524

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Method: In (I), the

elicitor used is a glycoprotein **elicitor** produced by a non-aggressive strain of the fungus *Ophiostoma ulmi*. The **elicitor** may be obtained from a culture filtrate of *Ophiostoma* strain Q412. The **elicitor** comprises a defined 409 amino acid sequence given in the specification.

Preferred Nucleic Acids: (II) comprises either:

(a) a nucleotide sequence encoding a **protein** comprising a defined amino acid sequence given in the specification (or a functional fragment); or

(b) a sequence encoding a glycoprotein **elicitor** and capable of hybridizing to a sequence complementary to a sequence of (a) under stringent hybridization conditions.

(II) comprises 1 of 2 defined sequences given in the specification.

Preferred **Proteins**: (IV) may be glycosylated.

L18 ANSWER 14 OF 21 WPIDS (C) 2003 THOMSON DERWENT
 AN 2000-256651 [22] WPIDS
 CR 2000-256650 [22]
 DNN N2000-190820 DNC C2000-078322
 TI Identification of non-host **plant** disease resistance genes comprises expressing resistance and non-host inducible genes in susceptible **plants**.
 DC C06 D16 P13
 IN ROMMENS, C M T; SWORDS, K M M; YAN, H; ZHANG, B
 PA (MONS) MONSANTO CO
 CYC 88
 PI WO 2000012736 A2 20000309 (200022)* EN 94p
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
 OA PT SD SE SL SZ UG ZW
 W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES
 FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS
 LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ
 TM TR TT UA UG UZ VN YU ZA ZW
 AU 9957960 A 20000321 (200031)
 EP 1108044 A2 20010620 (200135) EN
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
 RO SE SI
 BR 9913653 A 20010605 (200138)
 JP 2002523103 W 20020730 (200264) 119p
 ADT WO 2000012736 A2 WO 1999-US19899 19990831; AU 9957960 A AU 1999-57960
 19990831; EP 1108044 A2 EP 1999-945345 19990831, WO 1999-US19899 19990831;
 BR 9913653 A BR 1999-13653 19990831, WO 1999-US19899 19990831; JP
 2002523103 W WO 1999-US19899 19990831, JP 2000-567722 19990831
 FDT AU 9957960 A Based on WO 200012736; EP 1108044 A2 Based on WO 200012736;
 BR 9913653 A Based on WO 200012736; JP 2002523103 W Based on WO 200012736
 PRAI US 1998-98402P 19980831
 AB WO 200012736 A UPAB: 20021105
 NOVELTY - A method for identifying a nucleic acid sequence encoding a **protein** conferring resistance against a **plant** pathogen or **elicitor** comprises expressing resistance (R) and non-host inducible genes in susceptible **plants** to identify genes that have functional activity against a pathogen of interest.
 DETAILED DESCRIPTION - The method comprising:
 (a) selecting a non-host **plant** resistant to the pathogen or elicitor of interest;
 (b) recovering full-length resistance gene homologues present in the resistant **plant**;
 (c) screening the homologues for functionality by transforming tissue of a pathogen-susceptible **plant** with the homologues;
 (d) challenging the transformed tissue with elicitor or pathogen; and

(e) observing functional activity against the pathogen of interest.
INDEPENDENT CLAIMS are also included for the following:

(1) a nucleic acid segment (I) conferring non-host disease resistance to **plants** by responding to an avirulence gene in **plant** pathogens;

(2) a nucleic acid segment comprising 10 partial tobacco R-gene homologue sequences, 10 sequences representing 10 different subclasses of class I R-gene homologues or 6 sequences representing 6 different subclasses of class II R-gene homologues, an Enh3 genomic sequence, TOB-F12 DNA or an Nhrl gene or their complements or sequences that hybridize under conditions of high stringency, all sequences fully defined in the specification;

(3) a recombinant DNA expression system comprising an expression vector into which is inserted a heterologous DNA conferring non-host disease resistance to **plants** by responding to an avirulence gene in **plant** pathogens;

(4) a cell transformed with a heterologous DNA of (3);

(5) a transgenic **plant** transformed with (I); and

(6) **plants** transformed with R-genes isolated by the novel method, which render the **plants** resistant to pathogen of interest.

USE - The method is useful for isolating disease resistance genes in **plants**. The nucleic acid sequences identified by the method confer non-host disease resistance to **plants** by responding to avirulence genes in **plant** pathogens. The R-genes identified trigger a hypersensitive response in tobacco that is dependent on the presence of the *P. infestans* elicitor INF1. The sequences are useful for generating transgenic **plants** that are resistant to such pathogens. The transgenic **plants** are preferably Acacia, apple, banana, barley, bean, broccoli, cabbage, canola, carrot, citrus, coffee, corn, cotton, cucumber, Douglas fir, Eucalyptus, garlic, grape, Loblolly pine, melon, oat, oil palm, onion, an ornamental **plant**, pea, peanut, pepper, Poplar tree, potato, Radiata pine, rice, rye, sorghum, Southern pine, soybean, strawberry, sugarbeet, sugarcane, sunflower, Sweetgum, tea, tomato, turf, a vine and wheat. The DNA sequences are also useful for identifying related nucleic acid sequences that confer resistance to fungal pathogens on **plant** cells. The resistance genes can be used to control viral, fungal, bacterial or nematodal pathogens, including *Phytophthora*, Erysiphe, Puccinia, Septoria, Ustilago, Melampsora, Bremia, Venturia, Uromyces, Tilletia, Rhynchosporium, Pyrenophora, Fulvia, Fusarium oxysporum, Peronospora, *Pseudomonas syringae*, *Xanthomonas*, Cladosporium, Colletotrichum, tobacco mosaic virus, potato virus Y and X, Phialophora, Heterodera, Magnaporthe, brown **plant** hopper, green rice leafhopper, aphids, Pseudocercosporella and hessian fly.

ADVANTAGE - None given.

Dwg.0/7

TECH

UPTX: 20000508

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Method: The **plant** resistant to the pathogen or elicitor of interest demonstrates resistance with a hypersensitive response and is preferably tobacco or Solanum microdontum accession 498124. The pathogen of interest is *Phytophthora infestans*. The transformation is Agrobacterium-mediated. The pathogen susceptible **plant** is Nicotiana benthamiana. The challenge with the elicitor is done by co-transformation with gene for the elicitor. The elicitor is INF1. The functional activity can be identified by the presence of a pathogen- or elicitor-dependent hypersensitive response.

AN 1999-633875 [54] WPIDS
 CR 1999-603273 [52]
 DNC C1999-185133
 TI Use of phosphorous acid derivative to amplify **plant** defence response.
 DC C03
 IN FRITIG, B; KOPP, M; LABOURDETTE, G; LATORSE, M; SAINDRENAN, P
 PA (RHON) RHONE-POULENC AGROCHIMIE; (AVET) AVENTIS CROPS SCIENCE SA
 CYC 84
 PI WO 9953761 A1 19991028 (199954)* FR 50p
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
 OA PT SD SE SL SZ UG ZW
 W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE
 GH GM HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG
 MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG
 US UZ VN YU ZA ZW
 AU 9931526 A 19991108 (200014)
 BR 9909722 A 20001226 (200103)
 EP 1071332 A1 20010131 (200108) FR
 R: AT BE CH DE DK ES FR GB GR IE IT LI NL PT
 HU 2001001671 A2 20010928 (200168)
 KR 2001042762 A 20010525 (200168)
 ZA 2000006209 A 20020227 (200223) # 90p
 JP 2002511495 W 20020416 (200242) 62p
 MX 2000010030 A1 20011101 (200279)
 ADT WO 9953761 A1 WO 1999-FR844 19990412; AU 9931526 A AU 1999-31526 19990412;
 BR 9909722 A BR 1999-9722 19990412; WO 1999-FR844 19990412; EP 1071332 A1
 EP 1999-913385 19990412; WO 1999-FR844 19990412; HU 2001001671 A2 WO
 1999-FR844 19990412; HU 2001-1671 19990412; KR 2001042762 A KR 2000-711495
 20001016; ZA 2000006209 A ZA 2000-6209 20001101; JP 2002511495 W WO
 1999-FR844 19990412; JP 2000-544189 19990412; MX 2000010030 A1 MX
 2000-10030 20001013
 FDT AU 9931526 A Based on WO 9953761; BR 9909722 A Based on WO 9953761; EP
 1071332 A1 Based on WO 9953761; HU 2001001671 A2 Based on WO 9953761; JP
 2002511495 W Based on WO 9953761
 PRAI FR 1999-1811 19990211; FR 1998-5043 19980416; ZA 2000-6209
 20001101
 AB WO 9953761 A UPAB: 20021209
 NOVELTY - Use of antifungal and/or antibacterial and/or antiviral agents B
 to potentiate the physiological responses of **plants** elicited by
 compounds A, is new.
 ACTIVITY - Fungicidal, and/or bactericidal, and/or viricidal.
 MECHANISM OF ACTION - A sensitizes the **plant** to possible
 attack (hypersensitivity reaction (HR)) and B causes an augmentation in
 this reaction.
 USE - The combination of A and B is used to treat or prevent,
 especially to prevent, phytopathogenic fungi, and/or bacteria, and/or
 viruses by application to the aerial parts of **plants**. The
 following crops can be treated: cereals (wheat, barley, maize, rice),
 vegetables (haricots, onions, cabbage, potatoes, Cucurbitaceae, tomatoes,
 peppers, spinach, peas, lettuce, celery, endive), soft fruit (strawberries,
 raspberries), trees (apple, pear, cherry, citrus, ginseng, coconut palms,
 pecan, cacao, walnut, rubber, banana, olive, poplar), vines, sunflowers,
 beet, tobacco, and ornamental cultures.
 ADVANTAGE - A and B function in synergy, hence they can be used in
 smaller quantity with cost and environmental benefit. The combination
 reduces the risk of development of resistant fungal strains.
 Dwg.0/21
 TECH UPTX: 19991221
 TECHNOLOGY FOCUS - AGRICULTURE - Preferred **elicitors** A: A are

proteins, oligosaccharides (preferably trehalose), polysaccharides (preferably Elexa), lipids, glycolipids, glycoproteins, **peptides**, vegetable and/or fungal cell wall extract, fungi, Bion and/or its analogue, yeast extracts, salicylic acid and/or its esters, seaweed extracts (preferably Agrimer 540, Agrotonic, CAL, Laminaria sp. (L. digitalis, L. saccharina, L. hyperborea), Ascophyllum sp. (A. nodosum), Himanthalla sp. (H. elongata), Undaria sp. (U. pinnatifida), Fucus sp. (F. vesiculum), Ulva sp., Chondrus sp., Enteromorpha sp.). Preferred potentiators B: B are derivatives of phosphorous acid such as metallic phosphites, e.g. Al-phosetyl, Na-phosetyl, phosphorous acid and its alkaline and alkaline earth metal salts, Bion and its analogues, Elexa, isonicotinic acid, aminobutyric acid or methyl jasmonate. Preferred combinations: For a combination, B is Na-phosetyl, phosphorous acid, or Bion, and A is (i) beta-glucane type oligosaccharide isolated from the walls of **Phytophthora megasperma** (Pmg), (ii) a pectin oligomer, or (iii) beta-megaspermine; or B is phosphorous acid, Al-phosetyl, or Elexa, and A is Elexa, Bion, salicylic acid or one or more of its esters, yeast extract, trehalose, or spores of a non-host fungus; the combination of A and B may also include a conventional fungicide, or a conventional fungicide may be applied separately.

L18 ANSWER 16 OF 21 WPIDS (C) 2003 THOMSON DERWENT
 AN 1999-603273 [52] WPIDS
 CR 1999-633875 [54]
 DNC C1999-175746
 TI Increasing **plant** physiological responses to elicitors using antifungal and/or antibacterial and/or antiviral agents.
 DC C03
 IN FRITIG, B; KOPP, M; LABOURDETTE, G; LATORSE, M; SAINDRENAN, P; LATORSE, M
 P
 PA (AVET) AVENTIS CROPS SCIENCE SA; (RHON) RHONE-POULENC AGROCHIMIE
 CYC 3
 PI FR 2777423 A1 19991022 (199952)* 46p
 BR 9909722 A 20001226 (200103)
 KR 2001042762 A 20010525 (200168)
 ADT FR 2777423 A1 FR 1998-5043 19980416; BR 9909722 A BR 1999-9722 19990412, WO 1999-FR844 19990412; KR 2001042762 A KR 2000-711495 20001016
 FDT BR 9909722 A Based on WO.9953761
 PRAI FR 1998-5043 19980416; FR 1999-1811 19990211
 AB FR 2777423 A UPAB: 20011121

NOVELTY - One or more antifungal and/or antibacterial and/or antiviral agents (B) is used as amplifier for the physiological response of **plants** obtained following application of an elicitor (A).

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

- (1) a composition containing the agents (A) and (B); and
- (2) a process for treating **plants** using this composition.

ACTIVITY - Antifungal; antibacterial; virucide. *Nicotinia tabacum* cells were suspended in a culture medium and cultivated in darkness in the presence of H₃PO₃ (5 mM) and/or a beta -glucan oligosaccharide (10 µg/ml) isolated from the walls of **Phytophthora megasperma** (Pmg). The PAL activity was measured after the oligosaccharide had been added, and showed that phosphorous acid alone had no effect, but the combination had a greater effect and was longer lasting than when the Pmg oligosaccharide was used alone.

MECHANISM OF ACTION - The composition induces the natural defense mechanisms of the **plant**, such as activation of phenyl alanine ammonia-lyase (PAL), and activation of lipxygenase (LOX).

USE - Useful for treating e.g. cereals, vegetables, fruits, trees, vines, sunflowers, beets, tobacco and ornamental **plants** with antifungal, antibacterial and virucidal agents.

ADVANTAGE - The composition allows a synergism effect between (A) and (B).
Dwg.0/21

TECH UPTX: 19991210

TECHNOLOGY FOCUS - AGRICULTURE - Preferred Composition: Typical **elicitors** (A) are **proteins**, oligosaccharides, (especially trehalose), polysaccharides (especially Elexa (RTM)), lipids, glycolipids, glycoproteins, **peptides**, extracts vegetable and/or fungal wall tissue, fungi, Bion (RTM) and its analogues, yeast extracts, salicylic acid and/or its esters. Typical compounds (B) include phosphorous acid and its derivatives, such as metal phosphites (especially fosetyl-Al and fosetyl-Na), alkali and alkaline earth metal salts of phosphorous acid, Bion(RTM) and its analogues, Elexa (RTM), isonicotinic acid, aminobutyric acid, and methyl jasmonate. If desired treatment with (A) and (B) may be completed by treatment with a known fungicide, simultaneously or separately. The composition preferably contains an active material (0.05-95 %), together with supports and surfactants.

L18 ANSWER 17 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 1999-591325 [50] WPIDS

DNN N1999-436117 DNC C1999-172774

TI New pathogen-inducible promoter conferring pathogen resistance to a **plant**.

DC C06 D16 P13

IN CUSTERS, J; SIMONS, L H; STUIVER, M H

PA (MOGE-N) MOGEN INT NV; (ZENE) ZENECA MOGEN BV; (ZENE) ZENECA MOGEN NV; (SYGN) SYNGENTA MOGEN BV

CYC 87

PI WO 9950428 A2 19991007 (199950)* EN 45p

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SL SZ UG ZW

W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB
GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU
LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR
TT UA UG US UZ VN YU ZA ZW

AU 9934190 A 19991018 (200010)

BR 9909360 A 20001212 (200102)

EP 1062356 A2 20001227 (200102) EN

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI

CN 1295621 A 20010516 (200146)

JP 2002509728 W 20020402 (200225) 55p

ZA 2000005113 A 20020327 (200230) 64p

US 6465636 B1 20021015 (200271)

MX 2000009576 A1 20011201 (200282)

ADT WO 9950428 A2 WO 1999-EP2178 19990325; AU 9934190 A AU 1999-34190
19990325; BR 9909360 A BR 1999-9360 19990325; WO 1999-EP2178 19990325; EP
1062356 A2 EP 1999-915723 19990325; WO 1999-EP2178 19990325; CN 1295621 A
CN 1999-804665 19990325; JP 2002509728 W WO 1999-EP2178 19990325; JP
2000-541316 19990325; ZA 2000005113 A ZA 2000-5113 20000922; US 6465636 B1
WO 1999-EP2178 19990325; US 2000-647390 20000929; MX 2000009576 A1 MX
2000-9576 20000929

FDT AU 9934190 A Based on WO 9950428; BR 9909360 A Based on WO 9950428; EP
1062356 A2 Based on WO 9950428; JP 2002509728 W Based on WO 9950428; US
6465636 B1 Based on WO 9950428

PRAI EP 1998-201024 19980401

AB WO 9950428 A UPAB: 19991201

NOVELTY - A DNA fragment naturally driving the expression of a **plant** gene coding for hexose oxidase. The DNA is capable of promoting pathogen-inducible transcription of an associated DNA sequence

when re-introduced into a **plant**.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) A portion or variant of the DNA fragment capable of promoting pathogen-inducible transcription of an associated DNA when re-introduced into a **plant**;

(2) A chimeric DNA sequence comprising in the direction of transcription the DNA fragment/portion/variant, and a DNA sequence to be expressed under the transcriptional control of the fragment;

(3) A replica comprising a chimeric DNA sequence;

(4) A replica comprising in the direction of transcription a DNA fragment and at least one recognition site for a restriction endonuclease for insertion of a DNA sequence to be expressed under the control of the DNA fragment.

(5) A microorganism containing a replicon;

(6) A **plant** cell having a chimeric DNA sequence incorporated into its genome;

(7) A **plant** consisting of cells of claim (5);

(8) A part of a **plant** selected from seeds, flowers, tubers, roots, leaves, fruits, pollen and wood;

(9) A method for identifying homologues capable of promoting pathogen-induced transcription in a **plant**.

ACTIVITY - Inhibition. The hexose oxidase is toxic to (fungal) pathogens. A selection of in vitro plantlets were infected with the potato late blight causing fungus *Phytophthora infestans*. Leaves which showed disease symptoms were removed and stained for expression of the GUS gene by histochemical analysis. Results showed that the ms59 promoter responded to fungal infection but the level of induced expression was low.

USE - The chimeric DNA sequence can be used to transform **plants**. Also, for conferring pathogen resistance to a **plant** when the DNA sequence to be expressed causes the production of an antipathogenic protein. The portion or variant of DNA can be used for making hybrid regulatory DNA sequences.

ADVANTAGE - Previously employed promoters in similar studies have the disadvantage that they also active constitutively do not react to certain types of pathogens. An advantage of the promoters in this invention is that they regulate expression very soon after pathogen infection.

Dwg.0/1

TECH

UPTX: 19991201

TECHNOLOGY FOCUS - BIOLOGY - Preferred species - The DNA fragment is obtained from *Helianthus annuus* or *Lactuca sativa*. Preferred **plant** - The **plant** is dicotyledonous.

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred DNA fragment - The DNA fragment, portion or variant is the upstream regulatory region of the gene coding for hexose oxidase, denoted as WL64 and MS59, in *H.annuus* and *L.sativa*, respectively. Preferred chimeric DNA - The DNA sequence to be expressed within the chimeric DNA causes the production of an antipathogenic **protein** selected from the following group: chitinase, glucanase, osmotin, magainins, lectins, saccharide oxidase, oxalate oxidase, toxins from *Bacillus thuringiensis* antifungal **proteins** isolated from *Mirabilis jalapa*, *Amaranthus*, *Raphanus*, *Brassica*, *Sinapis*, *Arabidopsis*, *Dahlia*, *Cnicus*, *Lathyrus*, *Clitoria*, *Allium* seeds, *Aralia* and *Impatiens* and albumin-type **proteins** such as thionine, napin, barley trypsin inhibitor, cereal gliadin and wheat alpha-amylase. The chimeric DNA sequence causes the production of a **protein** that can induce a hypersensitive response selected from the following group: Cf, Ba3 and Pto **proteins** from tomato, Rpm1 and Rps2 from *Arabidopsis thaliana*, N-**protein** from tobacco, avr **proteins** from *Cladosporium fluvum*, harpins from *Erwinia* and elicitor **proteins** (avrBs3, avrRpm1, avrRpt2) from

Pseudomonas or Xanthomonas.

L18 ANSWER 18 OF 21 WPIDS (C) 2003 THOMSON DERWENT
 AN 1999-243578 [20] WPIDS
 DNC C1999-070961
 TI Imparting disease resistance to **plants**.
 DC C06 D16
 IN BEER, S V; BUTLER, J L
 PA (CORR) CORNELL RES FOUND INC; (EDEN-N) EDEN BIOSCIENCE CORP
 CYC 82
 PI WO 9911133 A1 19990311 (199920)* EN 26p
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
 OA PT SD SE SZ UG ZW
 W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE
 GH GM HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK
 MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ
 VN YU ZW
 AU 9890268 A 19990322 (199931)
 FI 2000000494 A 20000331 (200031)
 EP 1009237 A1 20000621 (200033) EN
 R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
 BR 9811434 A 20000822 (200050)
 AU 726360 B 20001102 (200062)
 CN 1280459 A 20010117 (200128)
 KR 2001023569 A 20010326 (200161)
 JP 2001514197 W 20010911 (200167) 36p
 US 6333302 B1 20011225 (200206)
 ADT WO 9911133 A1 WO 1998-US17252 19980820; AU 9890268 A AU 1998-90268
 19980820; FI 2000000494 A WO 1998-US17252 19980820, FI 2000-494 20000303;
 EP 1009237 A1 EP 1998-942153 19980820, WO 1998-US17252 19980820; BR
 9811434 A BR 1998-11434 19980820, WO 1998-US17252 19980820; AU 726360 B AU
 1998-90268 19980820; CN 1280459 A CN 1998-810797 19980820; KR 2001023569 A
 KR 2000-702217 20000302; JP 2001514197 W WO 1998-US17252 19980820, JP
 2000-508250 19980820; US 6333302 B1 Provisional US 1997-57464P 19970903,
 US 1998-136625 19980819
 FDT AU 9890268 A Based on WO 9911133; EP 1009237 A1 Based on WO 9911133; BR
 9811434 A Based on WO 9911133; AU 726360 B Previous Publ. AU 9890268,
 Based on WO 9911133; JP 2001514197 W Based on WO 9911133
 PRAI US 1997-57464P 19970903; US 1998-136625 19980819
 AB WO 9911133 A UPAB: 19990525
 NOVELTY - Imparting disease resistance to **plants** comprising
 applying a hypersensitive response **elicitor protein** or
polypeptide from Gram positive bacterium, in a non-infectious
 form, to a **plant** or **plant** seed, so that the
protein or **polypeptide** contacts the cells of the
plant or seed, is new.
 USE - The method can be utilized to treat a wide variety of
plants or their seeds to impart disease resistance, enhance
 growth, and/or control insects. Suitable **plants** include
 dicotyledons and monocotyledons. More particularly, useful crop
plants can include: alfalfa, rice, wheat, barley, rye, cotton,
 sunflower, peanut, corn, potato, sweet potato, bean, pea, chicory,
 lettuce, endive, cabbage, brussel sprout, beet, parsnip, turnip,
 cauliflower, broccoli, turnip, radish, spinach, onion, garlic, eggplant,
 pepper, celery, carrot, squash, pumpkin, zucchini, cucumber, apple, pear,
 melon, citrus, strawberry, grape, raspberry, pineapple, soybean, tobacco,
 tomato, sorghum, and sugarcane. Ornamental **plants** are:
 Arabidopsis thaliana, Saintpaulia, petunia, pelargonium, pointsettia,
 chrysanthemum, carnation and zinnia. The method imparts resistance to
 pathogens including viruses (e.g. Tobacco mosaic virus and Tomato mosaic

virus), bacteria (e.g. *Pseudomonas solanacearum* and *Xanthomonas campestris* pv. *Pelargonii*) and fungi (*Fusarium oxysporum* and *Phytophthora infestans*).

ADVANTAGE - Seeds of treated **plants** will carry the disease resistance into the next **plants** generated from them. The method can be used as part of other treatments applied to the **plants** and seeds.

Dwg.0/0

TECH

UPTX: 19990517

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred method: The protein or polypeptide is applied to the **plant** during a treatment. Seeds are treated with the protein or polypeptide prior to planting in natural or artificial soil, to propagate **plants** from the seeds. Preferred materials: The Gram positive bacterium is **Clavibacter**, especially *C. michiganensis* ssp. *sepedonicus*.

L18 ANSWER 19 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 1999-070210 [06] WPIDS

DNC C1999-020744

TI New fragments of an *Erwinia* hypersensitive response

elicitor protein and related DNA - used to impart disease resistance to **plants**, to increase their growth and to control insects.

DC C06 D16

IN BEER, S V; LABY, R J; WEI, Z

PA (CORR) CORNELL RES FOUND INC; (EDEN-N) EDEN BIOSCIENCE CORP; (BEER-I) BEER S V; (LABY-I) LABY R J; (WEI-I) WEI Z

CYC 83

PI WO 9854214 A2 19981203 (199906)* EN 94p

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SZ UG ZW

W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE
GH GM GW HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG
MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG
UZ VN YU ZW

AU 9877004 A 19981230 (199918)

FI 9902545 A 20000128 (200020)

EP 996729 A2 20000503 (200026) EN

R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

BR 9809699 A 20000711 (200041)

CN 1265145 A 20000830 (200059)

US 2001011380 A1 20010802 (200147)

KR 2001013226 A 20010226 (200154)

JP 2002501388 W 20020115 (200207) 109p

MX 9911007 A1 20010601 (200235)

AU 750732 B 20020725 (200260)

NZ 501138 A 20021122 (200301)

ADT WO 9854214 A2 WO 1998-US10874 19980528; AU 9877004 A AU 1998-77004 19980528; FI 9902545 A WO 1998-US10874 19980528; FI 1999-2545 19991129; EP 996729 A2 EP 1998-924950 19980528; WO 1998-US10874 19980528; BR 9809699 A BR 1998-9699 19980528; WO 1998-US10874 19980528; CN 1265145 A CN 1998-807613 19980528; US 2001011380 A1 Provisional US 1997-48109P 19970530; US 1998-86118 19980528; KR 2001013226 A KR 1999-711216 19991130; JP 2002501388 W WO 1998-US10874 19980528; JP 1999-500902 19980528; MX 9911007 A1 MX 1999-11007 19991129; AU 750732 B AU 1998-77004 19980528; NZ 501138 A NZ 1998-501138 19980528; WO 1998-US10874 19980528

FDT AU 9877004 A Based on WO 9854214; EP 996729 A2 Based on WO 9854214; BR 9809699 A Based on WO 9854214; JP 2002501388 W Based on WO 9854214; AU 750732 B Previous Publ. AU 9877004, Based on WO 9854214; NZ 501138 A Based on WO 9854214

PRAI US 1997-48109P 19970530; US 1998-86118 19980528
 AB WO 9854214 A UPAB: 19990224
 Isolated fragment (I) of an *Erwinia* hypersensitive response
elicitor protein or **polypeptide** (A) able to
 elicit a hypersensitive response in **plants** is new. Also new are:
 (1) isolated DNA (II) encoding (I); and (2) expression systems, host cells
 and transgenic **plants** (or their seeds) containing (II).
 USE - (I), in non-infectious form, is applied to **plants** to
 impart disease resistance (to a wide range of viral, bacterial and fungal
 pathogens), to improve growth (yield, quantity and quality of seeds, to
 provide earlier germination etc.) and/or to control insects (e.g. corn
 borers, Lepidoptera larvae etc.) The same results are provided by
 transgenic **plants** expressing (I).
 Dwg.0/11

L18 ANSWER 20 OF 21 WPIDS (C) 2003 THOMSON DERWENT
 AN 1997-051614 [05] WPIDS
 DNN N1997-042476 DNC C1997-016992
 TI Imparting pathogen resistance to **plants** - with hypersensitive
 response **elicitor polypeptide** or **protein**.
 DC C05 C06 D16 P13
 IN BEER, S V; WEI, Z
 PA (CORR) CORNELL RES FOUND INC
 CYC 71
 PI WO 9639802 A1 19961219 (199705)* EN 69p
 RW: AT BE CH DE DK EA ES FI FR GB GR IE IT KE LS LU MC MW NL OA PT SD
 SE SZ UG
 W: AL AM AT AU AZ BB BG BR BY CA CH CN CZ DE DK EE ES FI GB GE HU IS
 JP KE KG KP KR KZ LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT
 RO RU SD SE SG SI SK TJ TM TR TT UA UG UZ VN
 AU 9659821 A 19961230 (199716)
 US 5650387 A 19970722 (199735) 27p
 FI 9704430 A 19980126 (199817)
 US 5776889 A 19980707 (199834)
 EP 871354 A1 19981021 (199846) EN
 R: CH DE DK ES FR GB LI NL SE
 BR 9609073 A 19990126 (199910)
 US 5859324 A 19990112 (199910)
 JP 11506938 W 19990622 (199935) 61p
 NZ 309611 A 19990828 (199939)
 AU 714512 B 20000106 (200013)
 MX 9709781 A1 19981001 (200019)
 KR 99022577 A 19990325 (200023)
 CN 1192647 A 19980909 (200040)
 ADT WO 9639802 A1 WO 1996-US8819 19960605; AU 9659821 A AU 1996-59821
 19960605; US 5650387 A US 1995-475775 19950607; FI 9704430 A WO
 1996-US8819 19960605, FI 1997-4430 19971205; US 5776889 A Cont of US
 1995-475775 19950607, US 1997-891254 19970710; EP 871354 A1 EP 1996-917152
 19960605, WO 1996-US8819 19960605; BR 9609073 A BR 1996-9073 19960605, WO
 1996-US8819 19960605; US 5859324 A Div ex US 1995-475775 19950607, US
 1997-819539 19970317; JP 11506938 W WO 1996-US8819 19960605, JP
 1997-501304 19960605; NZ 309611 A NZ 1996-309611 19960605, WO 1996-US8819
 19960605; AU 714512 B AU 1996-59821 19960605; MX 9709781 A1 MX 1997-9781
 19971205; KR 99022577 A WO 1996-US8819 19960605, KR 1997-709058 19971206;
 CN 1192647 A CN 1996-196146 19960605
 FDT AU 9659821 A Based on WO 9639802; EP 871354 A1 Based on WO 9639802; BR
 9609073 A Based on WO 9639802; JP 11506938 W Based on WO 9639802; NZ
 309611 A Based on WO 9639802; AU 714512 B Previous Publ. AU 9659821, Based
 on WO 9639802; KR 99022577 A Based on WO 9639802
 PRAI US 1995-475775 19950607; US 1997-891254 19970710; US 1997-819539

19970317

AB WO 9639802 A UPAB: 19970129

A novel method of imparting pathogen resistance to **plants** comprises applying a hypersensitive response **elicitor polypeptide** or **protein** in a non-infectious form to a **plant** under conditions where the **polypeptide** or **protein** contacts cells of the **plant**.
Also claimed is a pathogen-resistant **plant** with cells in contact with [a] non-infectious hypersensitive response **elicitor polypeptide** or **protein**.

USE - The method may be used for imparting resistance to viruses, bacteria or fungi to crops and ornamental **plants**.
Dwg.0/2

L18 ANSWER 21 OF 21 WPIDS (C) 2003 THOMSON DERWENT

AN 1994-035054 [04] WPIDS

DNN N1994-027232 DNC C1994-016226

TI Hypersensitive response **elicitor protein** derived from **erwinia amylovora** - and DNA encoding it, useful for developing harpin inhibitors to prevent e.g. fire blight of fruit.

DC C06.D16.P13

IN BAUER, D W; BEER, S V; COLLMER, A; HE, S; LABY, R; WEI, Z

PA (CORR) CORNELL RES FOUND INC

CYC 19

PI WO 9401546 A1 19940120 (199404)* EN 47p

RW: AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE

W: JP

EP 648266 A1 19950419 (199520) EN

R: AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

JP 07509604 W 19951026 (199551) 14p

EP 648266 A4 19950705 (199617)

US 5849868 A 19981215 (199906)

US 6174717 B1 20010116 (200106)

ADT WO 9401546 A1 WO 1993-US6243 19930630; EP 648266 A1 EP 1993-918140 19930630, WO 1993-US6243 19930630; JP 07509604 W WO 1993-US6243 19930630, JP 1994-503402 19930630; EP 648266 A4 EP 1993-918140 ; US 5849868 A Cont of US 1992-907935 19920701, US 1994-200724 19940223; US 6174717 B1 Cont of US 1992-907935 19920701, Div ex US 1994-200724 19940223, US 1997-851376 19970505

FDT EP 648266 A1 Based on WO 9401546; JP 07509604 W Based on WO 9401546; US 6174717 B1 Div ex US 5849868

PRAI US 1992-907935 19920701; US 1994-200724 19940223; US 1997-851376 19970505

AB WO 9401546 A UPAB: 19940613

The following are claimed: (A) *E. Coli* DHSalpha(pCPP103power4) ATCC 69021; (B) an isolated **peptide** (I), which, when applied to the surface or internal tissues of a **plant** is capable of eliciting a hypersensitive response (HR) in the **plant**; (C) a biologically active **peptide** having the 385 amino acid (AA) sequence given in the specification or derivs. with more than 1 AA addition, deletion, substitution, and/or insertion, with the provision that the specified changes do not inhibit the biological activity of the 385 amino acid sequence; (D) a method to alter the disease or hypersensitive response in a **plant** which comprises providing the **plant** with an inhibitor of the harpin **elicitor** (i.e. the hypersensitive response **elicitor** from *Erwinia amylovora*) and allowing the inhibitor to react with the harpin **elicitor**; and (E) a gene for insertion into an appropriate host to allow for the expression of harpin comprising a 1158 bp. nucleic acid sequence (given in full in the specification); and derivs. having more than 7 nucleic acid addition

deletion, substitution, and/or insertion (provided expression of harpin is not inhibited), in combination with a vector, for the insertion of the sequence into the host.

USE - Harpin is the name proposed for the hypersensitive response (HR) **elicitor** from *E. amylovora*, the bacterium which causes fire blight of apples, pears and other rosaceous **plants**. This **elicitor** is considered to be the archetype for a family of proteinaceous HR **elicitors** that are produced by many different phytopathogenic bacteria. Isolation of the harpin **polypeptide** and knowledge of its genetic coding sequence will allow harpin to be further characterised so that techniques to inactivate, destroy or bind harpin could be developed. For example, anti-harpin antibodies could be generated to neutralise toxic effects on **plants**. The gene sequence can also be used to identify homologous genes from *Erwinia*, *Xanthomonas* and *Pseudomonas* spp that encode HR **elicitors**.

Dwg.0/2

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FILE LAST UPDATED: 26 Jan 2003 (20030126/ED)

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FILE 'HCAPLUS' ENTERED AT 12:00:52 ON 27 JAN 2003

L1 366 S ELICITOR? (L) (PROTEIN# OR PEPTIDE# OR POLYPEPTIDE#)
L2 501700 S PLANT#
L3 238 S L1 AND L2
L4 5022 S DESSICCAT? OR DESICCAT? OR LONGEV?
L5 16617 S (DESSICCAT? OR DESICCAT? OR LONGEV?)/AB
L6 4 S L3 AND (L4 OR L5)
L7 58370 S CLAVIBACTER OR ERWINIA OR PHYTOPHTHORA OR PSEUDOMONAS OR RALS
L9 76 S L7 AND L3 AND L2
L10 0 S L9 AND (HARVEST?)
L11 2 S L9 AND (HARVEST?)/AB
L12 2898 S POSTHARVEST? OR POSTHARVEST?/AB
L13 1 S L9 AND L12
L14 4 S L6 OR L11 OR L13
L15 32777 S TRANSGEN?
L16 12 S L9 AND L15
L17 2 S CUTTING# AND L9
L18 4 S L17 OR L14
L19 9 S L16 NOT L18

FILE 'HCAPLUS' ENTERED AT 12:07:08 ON 27 JAN 2003

=> d .ca 118 1-4;d .cal19 1-9

L18 ANSWER 1 OF 4 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2002:368228 HCAPLUS
DOCUMENT NUMBER: 136:365289
TITLE: Inhibition of **desiccation** of
cuttings removed from ornamental
plants by hypersensitive response

elicitor protein or polypeptide
 INVENTOR(S): Wei, Zhong-Min; Leon, Ernesto; Oviedo, Agustin
 PATENT ASSIGNEE(S): Eden Bioscience Corporation, USA
 SOURCE: PCT Int. Appl., 69 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002037960	A2	20020516	WO 2001-US43715	20011106
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG AU 2002036469 A5 20020521 AU 2002-36469 20011106 PRIORITY APPLN. INFO.: US 2000-248169P P 20001113 WO 2001-US43715 W 20011106				

AB **Desiccation** of cuttings removed from ornamental plants is inhibited by treating the cutting with a hypersensitive response elicitor protein or polypeptide derived from plant pathogen. The ornamental plants can be transgenic plants which express a heterologous hypersensitive response elicitor protein or polypeptide or the ornamental plants can be treated via topical application with a hypersensitive response elicitor protein or polypeptide. Alternatively, cuttings from the ornamental plant can be treated with a hypersensitive response elicitor protein or polypeptide, independent of any treatment provided to the ornamental plant from which the cutting is removed.

IC ICM A01N

CC 5-3 (Agrochemical Bioregulators)

ST **plant ornamental desiccation inhibitor**
elicitor protein polypeptide

IT Liliopsida

Magnoliopsida

(inhibition of **desiccation** by hypersensitive response
 elicitor of **cuttings** removed from)

IT Drying

Flower

Leaf

Stem

(inhibition of **desiccation** of **cuttings** removed from
 ornamental **plants** by hypersensitive response elicitor)

IT **Peptides**, biological studies

Proteins

RL: AGR (Agricultural use); BSU (Biological study, unclassified); BUU (Biological use, unclassified); BIOL (Biological study); USES (Uses)

(inhibition of **desiccation** of **cuttings** removed from
 ornamental **plants** by hypersensitive response **elicitor**
)

IT **Clavibacter**

Erwinia

Phytophthora

Plant pathogen
Pseudomonas
Ralstonia
Xanthomonas
 (inhibition of **desiccation** of **cuttings** removed from
 ornamental **plants** by hypersensitive response elicitor from)
 IT Transformation, genetic
 (inhibition of **desiccation** of **cuttings** removed from
 transgenic ornamental **plants** expressing hypersensitive
 response elicitor)
 IT Embryophyta
 (ornamental **plant**; inhibition of **desiccation** by
 hypersensitive response elicitor of **cuttings** removed from)
 IT Hormones, microbial
 RL: AGR (Agricultural use); BSU (Biological study, unclassified); BUU
 (Biological use, unclassified); BIOL (Biological study); USES (Uses)
 (phytoalexin-eliciting; inhibition of **desiccation** of
cuttings removed from ornamental **plants** by)
 IT Embryophyta
 (transgenic; inhibition of **desiccation** by hypersensitive
 response elicitor of **cuttings** removed from)

L18 ANSWER 2 OF 4 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2002:123055 HCAPLUS

DOCUMENT NUMBER: 136:179298

TITLE: Polynucleotides and **polypeptides** for
 hypersensitive response **elicitor** from
Xanthomonas campestris, and their uses

INVENTOR(S): Wei, Zhong-Min; Swanson, Shane S.

PATENT ASSIGNEE(S): Eden Bioscience Corporation, USA

SOURCE: PCT Int. Appl., 61 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002012293	A2	20020214	WO 2001-US23787	20010727
WO 2002012293	A3	20020808		
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
US 2002066122	A1	20020530	US 2001-829124	20010409
AU 2001078063	A5	20020218	AU 2001-78063	20010727
PRIORITY APPLN. INFO.:			US 2000-224053P	P 20000809
			US 2001-829124	A 20010409
			US 1998-103124P	P 19981005
			US 1999-412452	B2 19991004
			WO 2001-US23787	W 20010727
AB	The present invention is directed to an isolated DNA mol. encoding a Xanthomonas hypersensitive response elicitor protein or polypeptide. The DNA mol. and its encoded hypersensitive response elicitor protein or			

polypeptide have the following uses: imparting disease resistance to plants, enhancing plant growth, controlling insects on plants, imparting stress resistance, imparting post-harvest disease resistance, maximizing the benefit of or overcoming a yield penalty assocd. with a transgenic trait, inhibiting **desiccation** of cuttings from ornamental plants, promoting early flowering of an ornamental plant, and **harvesting** cuttings from ornamental plants. These can be achieved by applying the hypersensitive response elicitor in a non-infectious form to plants or plant seeds (or cuttings or fruits or vegetables **harvested** from such plants) or by expression of the hypersensitive response elicitor in transgenic plants. Expression vectors, host cells transgenic plants, transgenic plant cuttings, and transgenic plant seeds are also disclosed. Genomic DNA encoding the hypersensitive response elicitor protein from *Xanthomonas campestris pelargonii* was cloned and the recombinantly expressed protein was active in tobacco. Results of Southern blot hybridizations with a gene hreX probe suggest that the gene is present in many *Xanthomonas* species.

- IC ICM C07K014-195
- CC 5-2 (Agrochemical Bioregulators)
Section cross-reference(s): 3, 4, 6, 11
- ST DNA sequence **Xanthomonas** gene hreX-hypersensitive response
elicitor protein; transgenic **plant** recombinant
gene hreX **protein** disease resistance horticulture
- IT **Proteins**
RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL
(Biological study); PREP (Preparation); USES (Uses)
(ACC degrdn., transgene for; polynucleotides and **polypeptides**
for hypersensitive response **elicitor** from **Xanthomonas**
campestris, and their uses)
- IT **Toxins**
RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL
(Biological study); PREP (Preparation); USES (Uses)
(B.t., transgene for; polynucleotides and **polypeptides** for
hypersensitive response **elicitor** from **Xanthomonas**
campestris, and their uses)
- IT **Proteins**
RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL
(Biological study); PREP (Preparation); USES (Uses)
(*Photobacterium luminescens*, transgene for; polynucleotides and
polypeptides for hypersensitive response **elicitor**
from **Xanthomonas campestris**, and their uses)
- IT **Insecticides**
(biol.; polynucleotides and **polypeptides** for hypersensitive
response **elicitor** from **Xanthomonas campestris**, and
their uses)
- IT **Flower**
(color, transgenes for; polynucleotides and **polypeptides** for
hypersensitive response **elicitor** from **Xanthomonas**
campestris, and their uses)
- IT **Growth and development, plant**
(flowering, early; polynucleotides and **polypeptides** for
hypersensitive response **elicitor** from **Xanthomonas**
campestris, and their uses)
- IT **Proteins**
RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL
(Biological study); PREP (Preparation); USES (Uses)
(herbicide resistance, transgene for; polynucleotides and
polypeptides for hypersensitive response **elicitor**
from **Xanthomonas campestris**, and their uses)
- IT **Gene, microbial**

- RL: AGR (Agricultural use); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study); USES (Uses)
(hreX; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT Reproduction, **plant**
(male sterility, transgene for; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT DNA sequences
(of gene hreX isolated from *Xanthomonas campestris pelargonii*)
- IT Protein sequences
(of hypersensitive response **elicitor protein** isolated from *Xanthomonas campestris pelargonii*)
- IT Embryophyta
(ornamental **plant**; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT **Proteins**
RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)
(osmotins, transgene for; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT Plasmid vectors
(pEl72; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT Hormones, microbial
RL: AGR (Agricultural use); BPN (Biosynthetic preparation); PRP (Properties); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); USES (Uses)
(phytoalexin-eliciting; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT Food
(**plant** products, biochem. modified, transgene for; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT Disease resistance, **plant**
Genetic engineering
Herbicide resistance
Molecular cloning
Regeneration, **plant**
Xanthomonas
Xanthomonas campestris pelargonii
(polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT cDNA
RL: AGR (Agricultural use); BIOL (Biological study); USES (Uses)
(polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT Antisense RNA
RNA
RL: AGR (Agricultural use); BUU (Biological use, unclassified); BIOL (Biological study); USES (Uses)
(polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)
- IT Probes (nucleic acid)

RL: ARG (Analytical reagent use); BUU (Biological use, unclassified); PRP (Properties); ANST (Analytical study); BIOL (Biological study); USES (Uses)

(polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT Fruit

Vegetable

(preservation; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT Transformation, genetic

(recombinant host; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT Tobacco mosaic virus

(resistance to; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT Bacteria (Eubacteria)

Embryophyta

(transformed; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT Agglutinins and Lectins

RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)

(transgene for; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT Fructooligosaccharides

RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)

(transgenes for; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT Alfalfa (*Medicago sativa*)

Apple

Arabidopsis thaliana

Barley

Bean (*Phaseolus vulgaris*)

Beet

Broccoli

Brussels sprout

Cabbage

Canola

Capsicum

Carnation (*Dianthus*)

Carrot

Cauliflower

Celery (*Apium graveolens*)

Chicory (*Cichorium intybus*)

Chrysanthemum

Citrus

Corn

Cotton

Cranberry

Cucumber (*Cucumis sativus*)

Eggplant (*Solanum melongena*)

Endive (*Cichorium endivia*)

Garlic (*Allium sativum*)

Grape
Lettuce (*Lactuca sativa*)
Melon (**plant**)
Onion (*Allium cepa*)
Parsnip
Pea
Peanut (*Arachis hypogaea*)
Pear (*Pyrus communis*)
Pelargonium
Pepper (*Piper*)
Petunia
Pineapple (*Ananas comosus*)
Poinsettia
Potato (*Solanum tuberosum*)
Radish (*Raphanus sativus*)
Raspberry
Rice (*Oryza sativa*)
Rose (*Rosa*)
Rye
Saintpaulia
Seed
Sorghum
Soybean (*Glycine max*)
Spinach (*Spinacia oleracea*)
Squash (*Cucurbita*)
Squash (*Cucurbita pepo melopepo*)
Strawberry
Sugarcane
Sunflower
Sweet potato
Tobacco
Tomato
Tulip
Turnip
Wheat
Zinnia

(transgenic; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT **Proteins**

RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)
(viral, transgene for; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT **Stress, plant**

(water deficiency, resistance to **desiccation**; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT **Plant tissue**

(wound, **cutting**, resistance to **desiccation**; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT **Toxins**

RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)
(δ -endotoxins, transgene for; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from *Xanthomonas campestris*, and their uses)

IT 398585-12-1P

RL: AGR (Agricultural use); BPN (Biosynthetic preparation); PRP (Properties); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); USES (Uses)

(amino acid sequence; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from **Xanthomonas campestris**, and their uses)

IT 9000-92-4P, Amylase

RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)

(inhibitor, transgene for; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from **Xanthomonas campestris**, and their uses)

IT 398585-11-0 398585-13-2

RL: AGR (Agricultural use); BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological study); USES (Uses)

(nucleotide sequence; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from **Xanthomonas campestris**, and their uses)

IT 9001-06-3P, Chitinase 9001-57-4P, Invertase 9001-65-4P, Mannitol dehydrogenase 9012-33-3P, Chitinase 9026-12-4P, Barnase 37205-61-1P, Protease inhibitor 37341-58-5P, Phytase 103220-14-0P, Defensin

RL: AGR (Agricultural use); BPN (Biosynthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)

(transgene for; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from **Xanthomonas campestris**, and their uses)

IT 398593-40-3 398593-41-4 398593-42-5

RL: PRP (Properties)

(unclaimed nucleotide sequence; polynucleotides and **polypeptides** for hypersensitive response **elicitor** from **Xanthomonas campestris**, and their uses)

L18 ANSWER 3 OF 4 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2001:797991 HCAPLUS

DOCUMENT NUMBER: 135:299956

TITLE: Treatment of fruits or vegetables with hypersensitive response elicitor to inhibit **postharvest** disease or **desiccation**

INVENTOR(S): Wei, Zhong-Min; Qiu, Dewen; Remick, Dean

PATENT ASSIGNEE(S): Eden Bioscience Corporation, USA

SOURCE: PCT Int. Appl., 72 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001080639	A2	20011101	WO 2001-US12468	20010417
WO 2001080639	A3	20020221		
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,			

BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
 US 2002019337 A1 20020214 US 2001-835684 20010416
 EP 1274307 A2 20030115 EP 2001-927112 20010417
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
 IE, SI, LT, LV, FI, RO, MK, CY, AL, TR

PRIORITY APPLN. INFO.: US 2000-198359P P 20000419
 WO 2001-US12468 W 20010417

- AB A method of inhibiting **postharvest** disease or **desiccation** in a fruit or vegetable consists of either by treating a fruit or vegetable with a hypersensitive response elicitor protein or polypeptide under conditions effective to inhibit **postharvest** disease or **desiccation**, or by providing a transgenic plant or plant seed transformed with a DNA mol. encoding a hypersensitive response elicitor polypeptide or protein and growing the transgenic plant or transgenic plant produced from the transgenic plant seed under conditions effective to inhibit a **postharvest** disease or **desiccation** in a fruit or vegetable **harvested** from the transgenic plant. Also disclosed are DNA constructs and expression systems, host cells, and transgenic plants contg. the DNA construct.
- IC ICM A01N037-46
 ICS A01N063=00; A01N063-02
- CC 5-2 (Agrochemical Bioregulators)
 Section cross-reference(s): 17
- ST **protein polypeptide elicitor** fruit vegetable
postharvest disease **desiccation** inhibitor
- IT Agrobacterium
 (cell; encoding hypersensitive response **elicitor**
protein or **peptide** inhibiting fruits or vegetables
postharvest disease or **desiccation**)
- IT Plant cell
 (encoding hypersensitive response **elicitor** **protein**
 or **peptide** inhibiting fruits or vegetables
postharvest disease or **desiccation**)
- IT DNA
 RL: AGR (Agricultural use); BUU (Biological use, unclassified); BIOL (Biological study); USES (Uses)
 (encoding hypersensitive response **elicitor** **protein**
 or **peptide** inhibiting **postharvest** fruits or
 vegetables disease or **desiccation**)
- IT **Peptides**, biological studies
Proteins, specific or class
 RL: AGR (Agricultural use); BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
 (hypersensitive response **elicitors**; treatment of fruits or
 vegetables with hypersensitive response **elicitor** to inhibit
postharvest disease or **desiccation**)
- IT Hormones, microbial
 RL: AGR (Agricultural use); BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BUU (Biological use, unclassified); BIOL (Biological study); USES (Uses)
 (phytoalexin-eliciting; treatment of fruits or vegetables with
 hypersensitive response elicitor to inhibit **postharvest**
 disease or **desiccation**)
- IT Dicotyledon (Magnoliopsida)
 Monocotyledon (Liliopsida)
 Transformation, genetic
 (transgenic plant encoding hypersensitive response
elicitor **protein** or **peptide** inhibiting
 fruits or vegetables **postharvest** disease or

desiccation)
 IT Fruit
 Vegetable
 (treatment of fruits or vegetables to inhibit **postharvest**
 disease or **desiccation** with hypersensitive response
elicitor protein)
 IT **Erwinia**
Erwinia amylovora
Pantoea stewartii stewartii
Pectobacterium carotovorum
Pectobacterium chrysanthemi
Phytophthora
Pseudomonas
Pseudomonas syringae
Ralstonia solanacearum
Xanthomonas
 (treatment of fruits or vegetables to inhibit **postharvest**
 disease or **desiccation** with hypersensitive response
elicitor protein derived from)
 IT **Botrytis**
Penicillium
 (treatment of fruits or vegetables with hypersensitive response
elicitor protein against)
 IT Disease, **plant**
 Drying
 (treatment of fruits or vegetables with hypersensitive response
elicitor protein to inhibit **postharvest**)

L18 ANSWER 4 OF 4 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1995:383550 HCAPLUS

DOCUMENT NUMBER: 122:156399

TITLE: Changes in protein methylation associated with the
 elicitation response in cell cultures of alfalfa
 (Medicago sativa L.)

AUTHOR(S): Daniell, Timothy; Edwards, Robert

CORPORATE SOURCE: Department of Biological Sciences, University of
 Durham, Durham, DH1 3LE, UK

SOURCE: FEBS Letters (1995), 360(1), 57-61

CODEN: FEBLAL; ISSN: 0014-5793

PUBLISHER: Elsevier

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The methylation of endogenous proteins increased in alfalfa cell
 suspension cultures following treatment with a fungal elicitor. Carboxyl
 methylation, a post-translational modification assocd. with controlling
 the localization and **longevity** of proteins, was the dominant
 form of protein methylation in both elicited and unelicited cells.
 Protein methylation was restricted to a limited no. of peptides prior to
 elicitor treatment but as elicitation progressed the no. of endogenous
 substrates increased. Increases resulted from a combination of an
 elicitor-dependent increase in the activity of a protein carboxyl
 methyltransferase and the accumulation of preferred endogenous substrates
 in the latter stages of elicitation.

CC 11-2 (Plant Biochemistry)

ST **protein** methylation alfalfa suspension culture **elicitor**

IT **Plant** tissue culture

(suspension, protein methylation assocd. with the elicitation response
 in cell cultures of alfalfa)

'CAL19' IS NOT A VALID FORMAT FOR FILE 'HCAPLUS'
ENTER DISPLAY FORMAT (BIB):end

=> d .ca 119 1-9

L19 ANSWER 1 OF 9 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2001:923552 HCAPLUS

DOCUMENT NUMBER: 136:51265

TITLE: Expression of a hypersensitive response elicitor gene
in combination with other **transgenes** in
plants to improve growth, stress tolerance,
disease or insect resistance

INVENTOR(S): Wei, Zhong-Min; Derocher, Jay

PATENT ASSIGNEE(S): Eden Bioscience Corporation, USA

SOURCE: PCT Int. Appl., 86 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001095724	A2	20011220	WO 2001-US18955	20010613
WO 2001095724	A3	20020530		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,
LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU,
SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU,
ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,
DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,
BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

US 2002059658	A1	20020516	US 2001-880371	20010613
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PRIORITY APPLN. INFO.: US 2000-211585P P 20000615

AB The present invention relates to methods of improving the effectiveness of transgenic plants, either by maximizing the benefit of transgenic trait in transgenic plants or overcoming deleterious effects on growth, stress tolerance, disease resistance, or insect resistance in transgenic plants expressing a transgenic trait. By applying a hypersensitive response elicitor protein or polypeptide to a transgenic plant expressing a transgene which confers a transgenic trait, or by prep. a transgenic plant expressing both a transgene which confers a transgenic trait and a second transgene which confers hypersensitive response elicitor expression, it is possible to realize the max. benefit of the transgenic trait or overcome deleterious effects on growth, stress tolerance, disease or insect resistance, male sterility, modified flower color or biochem. modified plant products which result from or accompany expression of the transgene conferring the transgenic trait. The hypersensitive response elicitor protein can be applied to the plant or seed at a concn. greater than 0.5 nM by spraying, injection, dusting, immersion or leaf abrasion in water, aq. solns., slurries or powder.

IC ICM A01N063-00

CC 11-4 (Plant Biochemistry)

Section cross-reference(s): 3, 5

ST hypersensitive response **elicitor protein**

transgenic plants; growth stress tolerance disease
insect resistance **transgenic plants**

- IT Apple
Barley
Bean (*Phaseolus vulgaris*)
Broccoli
Cabbage
Canola
Capsicum
Carrot
Cauliflower
Celery (*Apium graveolens*)
Chicory (*Cichorium intybus*)
Corn
Cotton
Cranberry
Cucumber (*Cucumis sativus*)
Disease resistance, **plant**
Eggplant (*Solanum melongena*)
Endive (*Cichorium endivia*)
Garlic (*Allium sativum*)
Grape
Growth and development, **plant**
Lettuce (*Lactuca sativa*)
Melon (**plant**)
Onion (*Allium cepa*)
Pea
Peanut (*Arachis hypogaea*)
Pear (*Pyrus communis*)
Pineapple (*Ananas comosus*)
Potato (*Solanum tuberosum*)
Radish (*Raphanus sativus*)
Raspberry
Rice (*Oryza sativa*)
Rye
Sorghum
Soybean (*Glycine max*)
Spinach (*Spinacia oleracea*)
Squash (*Cucurbita*)
Squash (*Cucurbita pepo melopepo*)
Strawberry
Sugarcane
Sunflower
Sweet potato
Tobacco
Tomato
Turnip
Wheat
(expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Herbicide resistance
(hypersensitive response **elicitor protein** in generating improved; expression of hypersensitive response **elicitor** gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT **Clavibacter**
Erwinia
Phytophthora
Pseudomonas
Xanthomonas

- (hypersensitive response **elicitor protein** of;
expression of hypersensitive response **elicitor** gene in
combination with other **transgenes** in **plants** to
improve growth, stress tolerance, disease or insect resistance)
- IT Embryophyta
(hypersensitive response **elicitor protein** synthesis
in **transgenic**; expression of hypersensitive response
elicitor gene in combination with other **transgenes** in
plants to improve growth, stress tolerance, disease or insect
resistance)
- IT Seed
(hypersensitive response **elicitor protein** synthesis
in; expression of hypersensitive response **elicitor** gene in
combination with other **transgenes** in **plants** to
improve growth, stress tolerance, disease or insect resistance)
- IT **Proteins**
RL: AGR (Agricultural use); BSU (Biological study, unclassified); PRP
(Properties); BIOL (Biological study); USES (Uses)
(hypersensitive response **elicitor**; expression of
hypersensitive response **elicitor** gene in combination with
other **transgenes** in **plants** to improve growth,
stress tolerance, disease or insect resistance)
- IT Herbicides
(imidazolinone, resistance of **transgenic plants**;
expression of hypersensitive response **elicitor** gene in combination with
other **transgenes** in **plants** to improve growth,
stress tolerance, disease or insect resistance)
- IT **Plant virus**
(improving **plant** resistance to; expression of hypersensitive
response **elicitor** gene in combination with other **transgenes**
in **plants** to improve growth, stress tolerance, disease or
insect resistance)
- IT Peptidoglycans
RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL
(Biological study); USES (Uses)
(inhibitor synthesis in **transgenic plants**;
expression of hypersensitive response **elicitor** gene in combination with
other **transgenes** in **plants** to improve growth,
stress tolerance, disease or insect resistance)
- IT Flower
(modified color of; expression of hypersensitive response **elicitor** gene
in combination with other **transgenes** in **plants** to
improve growth, stress tolerance, disease or insect resistance)
- IT Genetic engineering
(of **plant** growth and stress or disease tolerance; expression
of hypersensitive response **elicitor** gene in combination with other
transgenes in **plants** to improve growth, stress
tolerance, disease or insect resistance)
- IT **Proteins**
RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL
(Biological study); USES (Uses)
(osmotins, synthesis in improving **plant** stress tolerance;
expression of hypersensitive response **elicitor** gene in
combination with other **transgenes** in **plants** to
improve growth, stress tolerance, disease or insect resistance)
- IT Food
(**plant** products, biochem. modified, hypersensitive response
elicitor protein in altering; expression of
hypersensitive response **elicitor** gene in combination with
other **transgenes** in **plants** to improve growth,

- stress tolerance, disease or insect resistance)
- IT Spodoptera frugiperda
(**plant** resistance to; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Gene
(processes, sense suppression of gene causing adverse effects in **transgenic plants**; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Photorhabdus luminescens
(**protein** in improving **plant** stress tolerance of; expression of hypersensitive response **elicitor** gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Nematoda
(reniform, **plant** resistance to; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Sulfonylureas
RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
(resistance of **transgenic plants**; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Reproduction, **plant**
(sterility, male, reversed by hypersensitive response **elicitor protein**; expression of hypersensitive response **elicitor** gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Agglutinins and Lectins
RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
(synthesis in improving **plant** stress tolerance; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Antisense DNA
RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
(to gene causing adverse effects in **transgenic plants**; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Stress, **plant**
(tolerance; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Verticillium
(wilt, **plant** resistance to; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT Toxins
RL: AGR (Agricultural use); BIOL (Biological study); USES (Uses)
(δ -endotoxins, synthesis in **transgenic plants**)

- ; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT 151438-54-9, Messenger
 RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
 (Messenger, **transgenic plants** treated with; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT 22059-21-8, Acc
 RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
 (enzymes degrading, synthesis in **transgenic plants**; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT 37205-61-1, Protease inhibitor
 RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
 (in improving **plant** stress tolerance; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT 9000-92-4, Amylase
 RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
 (inhibitors, in improving **plant** stress tolerance; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT 1071-83-6, Glyphosate 1689-84-5, Bromoxynil 51276-47-2, Glufosinate 74051-80-2, Sethoxydim 160759-37-5, Synchrony
 RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
 (resistance of **transgenic plants**; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT 9001-06-3, Endochitinase 9012-33-3, Chitobiase 103220-14-0, Defensin
 RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
 (synthesis in improving **plant** stress tolerance; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT 9001-57-4, Invertase 9001-65-4, Mannitol dehydrogenase 9026-12-4, Barnase 9037-90-5, Fructan 37288-62-3, S-Adenosylmethionine hydrolase 37341-58-5, Phytase
 RL: AGR (Agricultural use); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
 (synthesis in **transgenic plant**; expression of hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)
- IT 382669-12-7, 2: PN: WO0195724 SEQID: 2 unclaimed DNA 382669-14-9, 4: PN: WO0195724 SEQID: 4 unclaimed DNA 382669-16-1, 6: PN: WO0195724 SEQID: 6 unclaimed DNA 382669-18-3, 8: PN: WO0195724 SEQID: 8 unclaimed DNA 382669-20-7 382669-22-9 382669-24-1
 RL: PRP (Properties)

(unclaimed nucleotide sequence; expression of a hypersensitive response elicitor gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)

IT 382669-11-6 382669-13-8 382669-15-0 382669-17-2 382669-19-4
382669-21-8 382669-23-0 382669-25-2

RL: PRP (Properties)

(unclaimed **protein** sequence; expression of a hypersensitive response **elicitor** gene in combination with other **transgenes** in **plants** to improve growth, stress tolerance, disease or insect resistance)

L19 ANSWER 2 OF 9 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2001:713571 HCAPLUS

DOCUMENT NUMBER: 135:269069

TITLE: **Plant** harpin-binding protein and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance

INVENTOR(S): Song, Xiaoling; Fan, Hao; Wei, Zhong-Min

PATENT ASSIGNEE(S): Eden Bioscience Corporation, USA

SOURCE: PCT Int. Appl., 78 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001070988	A2	20010927	WO 2001-US8728	20010319
WO 2001070988	A3	20020404		
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
US 2002007501	A1	20020117	US 2001-810997	20010316
EP 1268805	A2	20030102	EP 2001-920516	20010319
R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR			

PRIORITY APPLN. INFO.:
US 2000-191649P P 20000323
US 2000-250710P P 20001201
WO 2001-US8728 W 20010319

AB The present invention is directed to an isolated protein which serves as a receptor in plants for a plant pathogen hypersensitive response elicitor. Also disclosed are nucleic acid mols. encoding such receptors as well as expression vectors, host cells, transgenic plants, and transgenic plant seeds contg. such nucleic acid mols. Both the protein and nucleic acid can be used to identify agents targeting plant cells to enhance a plant's receptivity to treatment with a hypersensitive response elicitor and to directly impart plant growth enhancement as well as resistance against disease, insects, and stress. Thus, the Arabidopsis thaliana cDNA and gene for Erwinia amylovora harpin-binding protein HrBP1 were cloned and sequenced. A partial cDNA for the rice HrBP1 homolog was also cloned and sequenced. HrBP1 was found everywhere is the A. thaliana plant. HrBP1 mRNA was found in many different plants (monocots as well as dicots).

Silencing of HrBP1 expression in *A. thaliana* enhanced its resistance to *Pseudomonas syringae* p.v. tomato infection. Overexpression of HrBP1 in tobacco resulted in enhanced resistance to tobacco mosaic virus.

- IC ICM C12N015-29
ICS C12N015-82; C12N015-11; C12N001-21; C12N005-10; A01H005-00;
G01N033-68; A01N065-00; A01N063-00
- CC 6-3 (General Biochemistry)
Section cross-reference(s): 3, 11
- ST sequence Arabidopsis rice harpin binding protein HrBP1 cDNA; disease stress insect resistance **transgenic plant** harpin binding protein
- IT Nucleic acids
RL: AGR (Agricultural use); BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BIOL (Biological study); USES (Uses)
(antisense; **plant** harpin-binding protein and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance)
- IT Bacteria (Eubacteria)
Plant cell
(harpin-binding protein-gene-expressing; **plant** harpin-binding protein and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance)
- IT Genetic vectors
(harpin-binding protein-encoding; **plant** harpin-binding protein and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance)
- IT **Clavibacter**
Erwinia
Erwinia amylovora
Phytophthora
Pseudomonas
Xanthomonas
(hypersensitive response **elicitors** of, receptor for; **plant** harpin-binding **protein** and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance)
- IT Disease resistance, **plant**
Growth and development, **plant**
Insect (Insecta)
Stress, **plant**
(**plant** harpin-binding protein and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance)
- IT Arabidopsis thaliana
Dicotyledon (Magnoliopsida)
Monocotyledon (Liliopsida)
Rice (*Oryza sativa*)
(**plant** pathogen hypersensitive response **elicitor** receptor of; **plant** harpin-binding **protein** and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance)
- IT Alfalfa (*Medicago sativa*)
Apple
Barley
Bean (*Phaseolus vulgaris*)
Beet
Broccoli
Brussels sprout
Cabbage

Capsicum
 Carnation (Dianthus)
 Carrot
 Cauliflower
 Celery (Apium graveolens)
 Chicory (Cichorium intybus)
 Chrysanthemum
 Citrus
 Corn
 Cotton
 Cucumber (Cucumis sativus)
 Eggplant (Solanum melongena)
 Endive (Cichorium endivia)
 Garlic (Allium sativum)
 Grape
 Lettuce (Lactuca sativa)
 Melon (**plant**)
 Onion (Allium cepa)
 Parsnip
 Peanut (Arachis hypogaea)
 Pear (Pyrus communis)
 Pelargonium
 Petunia
 Pineapple (Ananas comosus)
 Plant (Embryophyta)
 Poinsettia
 Potato (Solanum tuberosum)
 Radish (Raphanus sativus)
 Raspberry
 Rye
 Saintpaulia
 Seed
 Sorghum
 Soybean (Glycine max)
 Spinach (Spinacia oleracea)
 Squash (Cucurbita)
 Squash (Cucurbita pepo melopepo)
 Strawberry
 Sugarcane
 Sunflower
 Sweet potato
 Tobacco
 Tomato
 Turnip
 Wheat
 Zinnia

(**transgenic**, harpin-binding protein DNA-expressing;
plant harpin-binding protein and cDNA and **transgenic**
plants with enhanced growth and insect, disease and stress
 resistance)

IT 282748-10-1 363238-53-3

RL: BOC (Biological occurrence); BSU (Biological study, unclassified); PRP
 (Properties); BIOL (Biological study); OCCU (Occurrence)
 (amino acid sequence; **plant** harpin-binding protein and cDNA
 and **transgenic plants** with enhanced growth and
 insect, disease and stress resistance)

IT 362457-08-7 362457-09-8 362457-10-1 362457-12-3

RL: BUU (Biological use, unclassified); PRP (Properties); BIOL (Biological
 study); USES (Uses)
 (nucleotide sequence; **plant** harpin-binding protein and cDNA

and **transgenic plants** with enhanced growth and insect, disease and stress resistance)

IT 362457-11-2, 8: PN: WO0170988 SEQID: 8 unclaimed DNA
 RL: PRP (Properties)
 (unclaimed nucleotide sequence; **plant** harpin-binding protein and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance)

IT 363240-03-3
 RL: PRP (Properties)
 (unclaimed protein sequence; **plant** harpin-binding protein and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance)

IT 208755-87-7
 RL: PRP (Properties)
 (unclaimed sequence; **plant** harpin-binding protein and cDNA and **transgenic plants** with enhanced growth and insect, disease and stress resistance)

L19 ANSWER 3 OF 9 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2001:565226 HCAPLUS

DOCUMENT NUMBER: 135:148226

TITLE: Oomycete-resistant **transgenic plants**
 by virtue of pathogen-induced expression of a heterologous hypersensitive response elicitor

INVENTOR(S): Beer, Steven V.; Bauer, David W.

PATENT ASSIGNEE(S): Cornell Research Foundation, Inc., USA

SOURCE: PCT Int. Appl., 73 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001055347	A1	20010802	WO 2001-US2579	20010126
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
US 2002069434	A1	20020606	US 2001-770693	20010126
PRIORITY APPLN. INFO.:			US 2000-178565P	P 20000126

AB The present invention relates to a chimeric gene that includes a first DNA mol. encoding a hypersensitive response elicitor protein or polypeptide, a promoter operably linked 5' to the first DNA mol. to induce transcription of the first DNA mol. in response to activation of the promoter by an oomycete, and a 3' regulatory region operably linked to the first DNA mol. Also disclosed are an expression system and a host cell contg. the chimeric gene. The present invention also relates to a transgenic plant resistant to disease resulting from oomycete infection, the transgenic plant including the chimeric gene, wherein the promoter induces transcription of the first DNA mol. in response to infection of the plant by an oomycete. Transgenic seeds and transgenic cultivars obtained from the transgenic plant are also disclosed. Addnl. aspects of the present invention include methods of making a recombinant plant cell and a

transgenic plant.

IC ICM C12N005-04
ICS C12N015-09; C12N015-29; C12N015-31; C12N015-82; A01H005-00

CC 3-2 (Biochemical Genetics)
Section cross-reference(s): 11

ST **transgenic** disease resistant **plant**; harpin signal
peptide promoter DNA sequence

IT Reporter gene
RL: BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); PROC (Process)
(GUS; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT Gene, **plant**
RL: BPR (Biological process); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); PROC (Process)
(chimeric; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT Disease, **plant**
(fungal; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT Promoter (genetic element)
RL: BPR (Biological process); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); PROC (Process)
(gst1; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT Gene, microbial
RL: BPR (Biological process); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); PROC (Process)
(hrpN; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT Stress, **plant**
(infection; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT Agrobacterium
Agrobacterium tumefaciens
Arabidopsis thaliana
DNA sequences
Disease resistance, **plant**
Genetic engineering
Protein sequences
Tobacco (Nicotiana tabacum samsun)
(oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT Signal **peptides**
Transgene
RL: BPR (Biological process); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); PROC (Process)
(oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT Chimeric gene
RL: BPR (Biological process); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); PROC (Process)

(plant; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT **Clavibacter**

Erwinia

Erwinia amylovora

Pantoea stewartii stewartii

Pectobacterium carotovorum

Pectobacterium chrysanthemi

Phytophthora

Pseudomonas

Pseudomonas syringae syringae

Ralstonia solanacearum

Xanthomonas

(target hrpN donor; oomycete-resistant **transgenic**

plants by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT

Apple

Barley

Bean (*Phaseolus vulgaris*)

Bröccöli

Cabbage

Carrot

Cauliflower

Celery (*Apium graveolens*)

Chicory (*Cichorium intybus*)

Corn

Cotton

Cucumber (*Cucumis sativus*)

Eggplant (*Solanum melongena*)

Endive (*Cichorium endivia*)

Garlic (*Allium sativum*)

Grape

Lettuce (*Lactuca sativa*)

Melon (**plant**)

Onion (*Allium cepa*)

Pea

Peanut (*Arachis hypogaea*)

Pear (*Pyrus communis*)

Pepper (*Piper*)

Pineapple (*Ananas comosus*)

Potato (*Solanum tuberosum*)

Radish (*Raphanus sativus*)

Raspberry

Rice (*Oryza sativa*)

Rye

Sorghum

Soybean (*Glycine max*)

Spinach (*Spinacia oleracea*)

Squash (*Cucurbita*)

Squash (*Cucurbita pepo melopepo*)

Strawberry

Sugarcane

Sunflower

Sweet potato

Tobacco

Tomato

Turnip

Wheat

(target **transgenic plants**; oomycete-resistant

transgenic plants by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT Albugo
Aphanomyces
Bremia
Peronospora
Peronospora tabacina
Phytophthora nicotianae
Plasmopara
Plasmopara viticola
Pseudoperonospora
Pythium
Sclerospora
(targeted pathogens; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT 151217-41-3, **Protein harpinPss (Pseudomonas syringae syringae clone pSYH10 gene hrpZ)** 155979-23-0 186711-41-1 208997-00-6 247158-77-6 352204-76-3 352321-69-8 352322-32-8
RL: BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study)
(amino acid sequence; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT 140270-48-0 186711-42-2 186711-43-3 208997-01-7 222646-98-2 352507-98-3 352507-99-4
RL: BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study)
(nucleotide sequence; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT 151438-54-9, Harpin
RL: BPR (Biological process); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); PROC (Process)
(oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT 132051-12-8, genbank x06361 141011-59-8, genbank x58546
RL: BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study)
(oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of heterologous hypersensitive response elicitor)

IT 352508-31-7 352508-33-9 352508-34-0 352508-35-1 352508-36-2 352508-37-3 352508-38-4
RL: PRP (Properties)
(unclaimed nucleotide sequence; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of a heterologous hypersensitive response elicitor)

IT 352508-30-6 352508-32-8
RL: PRP (Properties)
(unclaimed **protein** sequence; oomycete-resistant **transgenic plants** by virtue of pathogen-induced expression of a heterologous hypersensitive response elicitor)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L19 ANSWER 4 OF 9 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:335576 HCAPLUS

DOCUMENT NUMBER: 133:1481
 TITLE: Methods of imparting stress resistance to
 plants with hypersensitive response
 elicitor proteins derived from
 fungal and bacterial pathogens
 INVENTOR(S): Wei, Zhong-Min; Schading, Richard L.
 PATENT ASSIGNEE(S): Eden Bioscience Corporation, USA
 SOURCE: PCT Int. Appl., 84 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000028055	A2	20000518	WO 1999-US26039	19991104
WO 2000028055	A3	20000914		
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
EP 1124974	A2	20010822	EP 1999-958773	19991104
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2002529095	T2	20020910	JP 2000-581221	19991104
PRIORITY APPLN. INFO.: US 1998-107243P P 19981105				
WO 1999-US26039 W 19991104				
AB	The present invention is directed to imparting stress resistance to plants. This can be achieved by applying a hypersensitive response elicitor protein to plants or plant seeds under conditions effective to impart stress resistance to plants or plants grown from the plant seeds. Alternatively, transgenic plants or plant seeds transformed with a DNA mol. encoding the elicitor can be provided and the transgenic plants or plants resulting from the transgenic plant seeds are grown under conditions effective to impart stress resistance to plants or plants grown from the plant seeds. The response elicitor proteins of the invention were derived from Erwinia, Pseudomonas, and Xanthomonas and were used to combat insecticide stress in cotton, drought stress in cucumber, herbicide stress in pepper, and calcium deficiency in tomato.			
IC	ICM C12N015-82			
	ICS C12N015-31; A01N063-02			
CC	3-2 (Biochemical Genetics)			
	Section cross-reference(s): 1, 5, 6, 10, 11			
ST	genetic engineering plant stress hypersensitive response			
	elicitor protein			
IT	Nutrition, plant			
	(calcium, deficiency; methods of imparting stress resistance to plants with hypersensitive response elicitor proteins derived from fungal and bacterial pathogens)			
IT	Air pollution			
	(carbon dioxide, resistance to; methods of imparting stress resistance to plants with hypersensitive response elicitor proteins derived from fungal and bacterial pathogens)			
IT	Stress, plant			

- (chem.; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Stress, **plant**
(cold; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Stress, **plant**
(environmental; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Stress, **plant**
(frost; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Stress, **plant**
(heat; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Environmental pollution
(heavy metal, resistance to; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Environmental pollution
(hydrocarbon, resistance to; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT **Clavibacter**
 Clavibacter michiganense
 Pantoea stewartii stewartii
 Pectobacterium carotovorum
 Phytophthora
 (hypersensitive response **elicitor** derived from; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT **Proteins, specific or class**
RL: AGR (Agricultural use); BAC (Biological activity or effector, except adverse); BPN (Biosynthetic preparation); BSU (Biological study, unclassified); BIOL (Biological study); PREP (Preparation); USES (Uses)
(hypersensitive response **elicitor**; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Stress, **plant**
(light deficiency; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Stress, **plant**
(light excess; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Nutrients
(macronutrients, resistance to nutritional stress caused by; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT **Erwinia amylovora**
Fungicide resistance
Genetic engineering

Herbicide resistance
 Insecticide resistance
 Pectobacterium chrysanthemi
 Pseudomonas syringae
 Ralstonia solanacearum
 Stress, **plant**
 Xanthomonas campestris glycines
 Xanthomonas campestris pelargonii
 (methods of imparting stress resistance to **plants** with
 hypersensitive response **elicitor proteins** derived
 from fungal and bacterial pathogens)

IT Nutrients
 (micronutrients, resistance to nutritional stress caused by; methods of
 imparting stress resistance to **plants** with hypersensitive
 response **elicitor proteins** derived from fungal and
 bacterial pathogens)

IT Environmental pollution
 (nitrogen oxide, resistance to; methods of imparting stress resistance
 to **plants** with hypersensitive response **elicitor**
 proteins derived from fungal and bacterial pathogens)

IT Stress, **plant**
 (nutrient deficiency; methods of imparting stress resistance to
 plants with hypersensitive response **elicitor**
 proteins derived from fungal and bacterial pathogens)

IT Environmental pollution
 (ozone, resistance to; methods of imparting stress resistance to
 plants with hypersensitive response **elicitor**
 proteins derived from fungal and bacterial pathogens)

IT UV radiation
 (resistance to excesses of; methods of imparting stress resistance to
 plants with hypersensitive response **elicitor**
 proteins derived from fungal and bacterial pathogens)

IT Fertilizers
 RL: ADV (Adverse effect, including toxicity); BIOL (Biological study)
 (resistance to nutritional stress caused by; methods of imparting
 stress resistance to **plants** with hypersensitive response
 elicitor proteins derived from fungal and bacterial
 pathogens)

IT Acid rain
 (resistance to; methods of imparting stress resistance to
 plants with hypersensitive response **elicitor**
 proteins derived from fungal and bacterial pathogens)

IT Air pollution
 (sulfur dioxide, resistance to; methods of imparting stress resistance
 to **plants** with hypersensitive response **elicitor**
 proteins derived from fungal and bacterial pathogens)

IT Alfalfa (*Medicago sativa*)
 Apple
 Arabidopsis thaliana
 Barley
 Beet
 Broccoli
 Brussels sprout
 Cabbage
 Capsicum
 Carnation (*Dianthus*)
 Carrot
 Cauliflower
 Celery (*Apium graveolens*)
 Chicory (*Cichorium intybus*)

Chrysanthemum
 Citrus
 Corn
 Cotton
 Cucumber (Cucumis sativus)
 Eggplant (Solanum melongena)
 Endive (Cichorium endivia)
 Garlic (Allium sativum)
 Grape
 Lettuce (Lactuca sativa)
 Melon (**plant**)
 Onion (Allium cepa)
 Parsnip
 Pea
 Peanut (Arachis hypogaea)
 Pear (Pyrus communis)
 Pelargonium
 Petunia
 Pineapple (Ananas comosus)
Plant (Embryophyta)
 Poinsettia
 Potato (Solanum tuberosum)
 Radish (Raphanus sativus)
 Raspberry
 Rice (Oryza sativa)
 Rye
 Saintpaulia
 Seed
 Sorghum
 Soybean (Glycine max)
 Spinach (Spinacia oleracea)
 Squash (Cucurbita)
 Squash (Cucurbita pepo melopepo)
 Strawberry
 Sugarcane
 Sunflower
 Sweet potato
 Tobacco
 Tomato
 Turnip
 Wheat
 Zinnia

- (**transgenic**/treated; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Stress, **plant**
 (water deficiency; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT Stress, **plant**
 (water; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT 630-08-0, CARBON monoxide, biological studies
 RL: BSU (Biological study, unclassified); BIOL (Biological study)
 (pollution, resistance to; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)
- IT 186711-42-2 186711-43-3 208997-01-7 215916-78-2 220672-59-3
 220672-72-0 220672-77-5 222646-98-2

RL: PRP (Properties)

(unclaimed nucleotide sequence; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)

IT 151217-41-3, **Protein** harpinPss (**Pseudomonas** syringae syringae clone pSYH10 gene hrpZ) 155979-23-0 186711-41-1 201366-40-7
201366-41-8 208293-02-1 208997-00-6 215797-46-9

RL: PRP (Properties)

(unclaimed **protein** sequence; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)

IT 208755-87-7 208755-88-8

RL: PRP (Properties)

(unclaimed sequence; methods of imparting stress resistance to **plants** with hypersensitive response **elicitor proteins** derived from fungal and bacterial pathogens)

L19 ANSWER 5 OF 9 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2000:241283 HCAPLUS

DOCUMENT NUMBER: 132:275186

TITLE: Sequences encoding fragments of microbial hypersensitive response **elicitor proteins** which are active but do not elicit a hypersensitive response, and their applications in **plant** genetic engineering

INVENTOR(S): Wei, Zhong-Min; Fan, Hao; Niggemeyer, Jennifer L.

PATENT ASSIGNEE(S): Eden Bioscience Corporation, USA

SOURCE: PCT Int. Appl., 100 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000020452	A2	20000413	WO 1999-US23181	19991005
WO 2000020452	A3	20000706		
W:	AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
CA 2344593	AA	20000413	CA 1999-2344593	19991005
AU 9965085	A1	20000426	AU 1999-65085	19991005
BR 9915345	A	20010731	BR 1999-15345	19991005
EP 1119582	A2	20010801	EP 1999-953057	19991005
R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO			
JP 2002526101	T2	20020820	JP 2000-574563	19991005
NO 2001001729	A	20010605	NO 2001-1729	20010405
PRIORITY APPLN. INFO.:			US 1998-103050P P	19981005
			WO 1999-US23181 W	19991005

AB The invention provides sequences encoding active fragments of a hypersensitive response elicitor protein which does not elicit a

hypersensitive response in plants. Specifically, the fragments are derived from hypersensitive response elicitor proteins from *Erwinia amylovora* (gene hrpN) and/or *Pseudomonas syringae* (gene hrpZ). Isolated fragments of hypersensitive response elicitor proteins have the following activities: imparting disease resistance to plants, enhancing plant growth, and/or controlling insects on plants. This can be achieved by applying the fragments of a hypersensitive response elicitor in a non-infectious form to plants or plant seeds, or by using transgenic plants or plant seeds transformed with a DNA mol. encoding the hypersensitive response elicitor fragment.

- IC ICM C07K014-195
ICS C12N015-31; C12N001-21; C12N005-10; A01H005-00; A01H005-10;
C12N015-82
- CC 3-3 (Biochemical Genetics)
Section cross-reference(s): 6, 10, 11
- ST sequence hypersensitive response **elicitor protein**
fragment **Pseudomonas Erwinia**; plant insect
disease growth hypersensitive response **elicitor protein**
fragment
- IT Insect (Insecta)
(control; sequences encoding fragments of microbial hypersensitive
response **elicitor proteins** which are active but do
not elicit hypersensitive response, and their applications in
plant genetic engineering)
- IT Growth and development, **plant**
(enhancement; sequences encoding fragments of microbial hypersensitive
response **elicitor proteins** which are active but do
not elicit hypersensitive response, and their applications in
plant genetic engineering)
- IT **Proteins**, specific or class
RL: AGR (Agricultural use); BAC (Biological activity or effector, except
adverse); BOC (Biological occurrence); BPN (Biosynthetic preparation); BSU
(Biological study, unclassified); PRP (Properties); BIOL (Biological
study); OCCU (Occurrence); PREP (Preparation); USES (Uses)
(harpin; sequences encoding fragments of microbial hypersensitive
response **elicitor proteins** which are active but do
not elicit hypersensitive response, and their applications in
plant genetic engineering)
- IT Gene, microbial
RL: AGR (Agricultural use); BOC (Biological occurrence); BSU (Biological
study, unclassified); PRP (Properties); BIOL (Biological study); OCCU
(Occurrence); USES (Uses)
(hrp, hrpN (**Erwinia amylovora**); sequences encoding fragments
of microbial hypersensitive response **elicitor**
proteins which are active but do not elicit hypersensitive
response, and their applications in **plant** genetic
engineering)
- IT Gene, microbial
RL: AGR (Agricultural use); BOC (Biological occurrence); BSU (Biological
study, unclassified); PRP (Properties); BIOL (Biological study); OCCU
(Occurrence); USES (Uses)
(hrp, hrpZ (**Pseudomonas syringae**); sequences encoding
fragments of microbial hypersensitive response **elicitor**
proteins which are active but do not elicit hypersensitive
response, and their applications in **plant** genetic
engineering)
- IT Tobacco mosaic virus
(**plants** resistant to; sequences encoding fragments of
microbial hypersensitive response **elicitor proteins**
which are active but do not elicit hypersensitive response, and their

applications in **plant** genetic engineering)

IT Disease, **plant**
 (resistance; sequences encoding fragments of microbial hypersensitive response **elicitor proteins** which are active but do not elicit hypersensitive response, and their applications in **plant** genetic engineering)

IT Alfalfa (Medicago sativa)
 Apple
 Arabidopsis thaliana
 Barley
 Bean (Phaseolus vulgaris)
 Beet
 Broccoli
 Brussels sprout
 Cabbage
 Capsicum
 Carnation (Dianthus)
 Carrot
 Cauliflower
 Celery (Apium graveolens)
 Chicory (Cichorium intybus)
 Chrysanthemum
 Citrus
 Corn
 Cotton
 Cucumber (Cucumis sativus)
 Eggplant (Solanum melongena)
 Endive (Cichorium endivia)
Erwinia
Erwinia amylovora
 Garlic (Allium sativum)
 Genetic vectors
 Grape
 Lettuce (Lactuca sativa)
 Melon (**plant**)
 Molecular cloning
 Onion (Allium cepa)
 Parsnip
 Pea
 Peanut (Arachis hypogaea)
 Pear (Pyrus communis)
 Pelargonium
 Petunia
Phytophthora
 Pineapple (Ananas comosus)
 Poinsettia
 Potato (Solanum tuberosum)
Protein sequences
Pseudomonas
Pseudomonas syringae
 Radish (Raphanus sativus)
 Raspberry
 Rice (Oryza sativa)
 Rye
 Saintpaulia
 Sorghum
 Soybean (Glycine max)
 Spinach (Spinacia oleracea)
 Squash (Cucurbita)
 Squash (Cucurbita pepo melopepo)

Strawberry
Sugarcane
Sunflower
Sweet potato
Tobacco
Tomato
Turnip
Wheat

Xanthomonas
Zinnia
cDNA sequences

(sequences encoding fragments of microbial hypersensitive response **elicitor proteins** which are active but do not elicit hypersensitive response, and their applications in **plant genetic engineering**)

IT Seed

(**transgenic plant seed**; sequences encoding fragments of microbial hypersensitive response **elicitor proteins** which are active but do not elicit hypersensitive response, and their applications in **plant genetic engineering**)--

IT **Plant (Embryophyta)**

(**transgenic**; sequences encoding fragments of microbial hypersensitive response **elicitor proteins** which are active but do not elicit hypersensitive response, and their applications in **plant genetic engineering**)

IT 151217-41-3DP, **Protein harpinPss (Pseudomonas syringae syringae clone pSYH10 gene hrpZ)**, subfragments are claimed
208997-00-6DP, subfragments are claimed 263749-47-9P 263749-48-0P
263749-49-1P 263884-99-7P 263885-00-3P 263885-01-4P 263885-02-5P
263885-03-6P 263901-65-1P

RL: AGR (Agricultural use); BAC (Biological activity or effector, except adverse); BOC (Biological occurrence); BPN (Biosynthetic preparation); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); OCCU (Occurrence); PREP (Preparation); USES (Uses)

(amino acid sequence; sequences encoding fragments of microbial hypersensitive response **elicitor proteins** which are active but do not elicit hypersensitive response, and their applications in **plant genetic engineering**)

IT 186711-43-3 208997-01-7 215916-78-2 220672-59-3 220672-72-0
220672-77-5 222646-98-2 263885-44-5, 1: PN: WO0020452 SEQID: 1
unclaimed DNA 263885-45-6, 2: PN: WO0020452 SEQID: 2 unclaimed DNA
263885-46-7, 3: PN: WO0020452 SEQID: 3 unclaimed DNA 263885-47-8, 4: PN:
WO0020452 SEQID: 4 unclaimed DNA 263885-48-9, 5: PN: WO0020452 SEQID: 5
unclaimed DNA 263885-49-0, 6: PN: WO0020452 SEQID: 6 unclaimed DNA
263885-50-3, 7: PN: WO0020452 SEQID: 7 unclaimed DNA 263885-51-4, 8: PN:
WO0020452 SEQID: 8 unclaimed DNA 263885-52-5, 9: PN: WO0020452 SEQID: 9
unclaimed DNA 263885-53-6 263885-54-7 263885-55-8 263885-56-9
263885-57-0 263885-58-1 263885-59-2 263885-60-5 263885-61-6
263885-62-7 263885-63-8 263885-64-9

RL: PRP (Properties)

(unclaimed nucleotide sequence; sequences encoding fragments of microbial hypersensitive response **elicitor proteins** which are active but do not elicit a hypersensitive response, and their applications in **plant genetic engineering**)

IT 155979-23-0 186711-41-1 201366-40-7 201366-41-8 208293-02-1
215797-46-9

RL: PRP (Properties)

(unclaimed **protein** sequence; sequences encoding fragments of microbial hypersensitive response **elicitor proteins**)

which are active but do not elicit a hypersensitive response, and their applications in **plant** genetic engineering)

IT 157849-44-0 208755-87-7 208755-88-8

RL: PRP (Properties)

(unclaimed sequence; sequences encoding fragments of microbial hypersensitive response **elicitor proteins** which are active but do not elicit a hypersensitive response, and their applications in **plant** genetic engineering)

L19 ANSWER 6 OF 9 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1999:3333 HCAPLUS

DOCUMENT NUMBER: 130:78798

TITLE: Hypersensitive response elicitor from **Erwinia chrysanthemi**

INVENTOR(S): Bauer, David; Collmer, Alan

PATENT ASSIGNEE(S): Cornell Research Foundation, Inc., USA

SOURCE: U.S., 27 pp.

CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5850015	A	19981215	US 1995-484358	19950607
US 6001959	A	19991214	US 1998-118959	19980717

PRIORITY APPLN. INFO.: US 1995-484358 19950607

AB The present invention relates to an isolated protein or polypeptide corresponding to a protein or polypeptide in *Erwinia chrysanthemi* which elicits a hypersensitive response in plants. The encoding DNA mol. alone in isolated form or either in an expression system, a host cell, or a transgenic plant are also disclosed. Another aspect of the present invention relates to a method of imparting pathogen resistance to plants by transforming a plant with the DNA mol. of the present invention.

IC ICM C12N015-29

ICS C12N015-82; A01H004-00; A01H005-00

NCL 800205000

CC 11-5 (Plant Biochemistry)

Section cross-reference(s): 3, 6, 10

ST hypersensitive response elicitor gene hrpN sequence **Erwinia**

IT Capsicum annuum

Chicory (*Cichorium intybus*)

Pelargonium hortorum

Petunia hybrida

Saintpaulia ionantha

Squash (*Cucurbita maxima*)

Tobacco (*Nicotiana tabacum xanthi*)

Tomato

Zinnia elegans

(elicitation of necrosis in; hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT Gene, microbial

RL: BPN (Biosynthetic preparation); PRP (Properties); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)

(hrpN; hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT Disease resistance, **plant**

Molecular cloning

Pectobacterium chrysanthemi

(hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT DNA sequences
(of gene hrpN encoding hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT Protein sequences
(of hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT Transformation, genetic
(pathogen resistance; hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT Hormones, microbial
RL: BPN (Biosynthetic preparation); PRP (Properties); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(phytoalexin-eliciting; hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT Dicotyledon (Magnoliopsida)
Monocotyledon (Liliopsida)
Plant (Embryophyta)
(transgenic; hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT 186711-41-1P
RL: BPN (Biosynthetic preparation); PRP (Properties); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(amino acid sequence; hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT 151438-54-9P, Harpin
RL: BPN (Biosynthetic preparation); PRP (Properties); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(hypersensitive response elicitor from **Erwinia chrysanthemi**)

IT 186711-42-2P 218280-75-2P
RL: BPN (Biosynthetic preparation); PRP (Properties); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(nucleotide sequence; hypersensitive response elicitor from **Erwinia chrysanthemi**)

REFERENCE COUNT: 39 THERE ARE 39 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L19 ANSWER 7 OF 9 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1998:795045 HCAPLUS

DOCUMENT NUMBER: 130:49943

TITLE: Hypersensitive response elicitor
protein fragments and their use to enhance
plant growth and protect plants from
insects and disease

INVENTOR(S): Laby, Ronald J.; Wei, Zhong-min; Beer, Steven V.

PATENT ASSIGNEE(S): Cornell Research Foundation, Inc., USA; Eden
Bioscience Corporation

SOURCE: PCT Int. Appl., 94 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9854214	A2	19981203	WO 1998-US10874	19980528
WO 9854214	A3	19990304		

W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE,
DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG,

KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX,
 NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT,
 UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
 RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES,
 FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI,
 CM, GA, GN, ML, MR, NE, SN, TD, TG

AU 9877004 A1 19981230 AU 1998-77004 19980528

AU 750732 B2 20020725

EP 996729 A2 20000503 EP 1998-924950 19980528

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
 IE, FI

BR 9809699 A 20000711 BR 1998-9699 19980528

US 2001011380 A1 20010802 US 1998-86118 19980528

JP 2002501388 T2 20020115 JP 1999-500902 19980528

FI 9902545 A 20000128 FI 1999-2545 19991129

PRIORITY APPLN. INFO.:

US 1997-48109P P 19970530

WO 1998-US10874 W 19980528

AB The present invention is directed to isolated fragments of an *Erwinia* hypersensitive response elicitor protein, such as harpin, which elicit a hypersensitive response in plants. Also disclosed are isolated DNA mols. which encode the *Erwinia* hypersensitive response-eliciting fragments. The fragments and DNA mols. that encode them can be used to impart disease resistance to plants, to enhance plant growth, and/or to control insects on plants. This can be achieved by applying the hypersensitive response-eliciting fragments in a non-infectious form to plants or plant seeds. Alternatively, transgenic plants or plant seeds transformed with an hypersensitive response-eliciting fragment-encoding DNA mol. can be employed. Thus, N-terminal, C-terminal and internal fragments of *E. amylovora* harpin which induced the hypersensitive response in tobacco and protected tobacco from TMV were identified.

IC ICM C07K014-00

CC 11-5 (Plant Biochemistry)

ST **plant** growth disease insect resistance harpin peptide;

Erwinia hypersensitive response eliciting peptide

transgenic plant seed

IT Disease resistance, **plant**

Erwinia

Erwinia amylovora

Growth and development, **plant**

Insect (Insecta)

Pantoea stewartii stewartii

Pectobacterium carotovorum

Pectobacterium chrysanthemi

(hypersensitive response **elicitor protein** fragments

and their use to enhance **plant** growth and protect

plants from insects and disease)

IT **Proteins**, specific or class

RL: BSU (Biological study, unclassified); BIOL (Biological study)

(hypersensitive response-eliciting; hypersensitive response

elicitor protein fragments and their use to enhance

plant growth and protect **plants** from insects and

disease)

IT Protein sequences

(of hypersensitive response-eliciting fragments of harpin of

Erwinia amylovora)

IT Alfalfa (*Medicago sativa*)

Apple

Arabidopsis thaliana

Barley

Bean (*Phaseolus vulgaris*)

Beet
 Broccoli
 Brussels sprout
 Cabbage
 Capsicum
 Carnation (Dianthus)
 Carrot
 Cauliflower
 Celery (Apium graveolens)
 Chicory (Cichorium intybus)
 Chrysanthemum
 Citrus
 Corn
 Cotton
 Cucumber (Cucumis sativus)
 Eggplant (Solanum melongena)
 Endive (Cichorium endivia)
 Garlic (Allium sativum)
 Grape
 Lettuce (Lactuca sativa)
 Melon (plant)
 Onion (Allium cepa)
 Parsnip
 Pea
 Peanut (Arachis hypogaea)
 Pear (Pyrus communis)
 Pelargonium
 Petunia
 Pineapple (Ananas comosus)
 Plant (Embryophyta)
 Poinsettia
 Potato (Solanum tuberosum)
 Radish (Raphanus sativus)
 Raspberry
 Rice (Oryza sativa)
 Rye
 Saintpaulia
 Seed
 Sorghum
 Soybean (Glycine max)
 Spinach (Spinacia oleracea)
 Squash (Cucurbita)
 Squash (Cucurbita pepo melopepo)
 Strawberry
 Sugarcane
 Sunflower
 Sweet potato
 Tobacco
 Tomato
 Turnip
 Wheat
 Zinnia

(transgenic; hypersensitive response elicitor
 protein fragments and their use to enhance plant
 growth and protect plants from insects and disease)

IT 217307-65-8, 105-403-Harpin (Erwinia amylovora) 217307-66-9,
 1-98-Harpin (Erwinia amylovora) 217307-67-0, 1-104-Harpin (
 Erwinia amylovora) 217307-68-1, 1-122-Harpin (Erwinia
 amylovora) 217307-69-2, 1-168-Harpin (Erwinia amylovora)
 217307-70-5, 1-218-Harpin (Erwinia amylovora) 217307-71-6,

1-266-Harpin (*Erwinia amylovora*) 217307-72-7, 1-342-Harpin (*Erwinia amylovora*) 217307-73-8, 1-321-Harpin (*Erwinia amylovora*) 217307-74-9, 1-372-Harpin (*Erwinia amylovora*) 217307-75-0, 76-209-Harpin (*Erwinia amylovora*) 217307-76-1, 105-209-Harpin (*Erwinia amylovora*) 217307-77-2, 99-209-Harpin (*Erwinia amylovora*) 217307-78-3, 109-204-Harpin (*Erwinia amylovora*) 217307-79-4, 109-200-Harpin (*Erwinia amylovora*) 217307-80-7, 105-180-Harpin (*Erwinia amylovora*) 217434-84-9, 137-204-Harpin (*Erwinia amylovora*) 217434-86-1, 137-200-Harpin (*Erwinia amylovora*)
 RL: AGR (Agricultural use); BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); USES (Uses)

(amino acid sequence; hypersensitive response **elicitor**
protein fragments and their use to enhance **plant**
 growth and protect **plants** from insects and disease)

IT 217434-96-3

RL: AGR (Agricultural use); BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); USES (Uses)

(**harpin peptide**; hypersensitive response **elicitor**
protein fragments and their use to enhance **plant**
 growth and protect **plants** from insects and disease)

L19 ANSWER 8 OF 9 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1998:29437 HCAPLUS

DOCUMENT NUMBER: 128:125913

TITLE: **Phytophthora** resistance through production
 of a fungal **protein elicitor**
 (.beta.-cryptogein) in tobacco

AUTHOR(S): Tepfer, David; Boutteaux, Catherine; Vigon, Catherine;
 Aymes, Sylvie; Perez, Valerie; O'Donohue, Michael J.;
 Huet, Jean-Claude; Pernollet, Jean-Claude

CORPORATE SOURCE: Biol. de la Rhizosphere, INRA, Versailles, F-78026,
 Fr.

SOURCE: Molecular Plant-Microbe Interactions (1998), 11(1),
 64-67

CODEN: MPMIEL; ISSN: 0894-0282

PUBLISHER: APS Press

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Transformation of tobacco with a gene encoding the fungal elicitor protein
 .beta.-cryptogein resulted in resistance to the pathogen *Phytophthora*
parasitica var. *nicotianae*. Resistance was improved when the foreign gene
 was in the hemizygous state, and a single amino acid substitution that
 reduced the necrotic effects of the protein also conferred some
 resistance.

CC 11-5 (Plant Biochemistry)

Section cross-reference(s): 10

ST cryptogein **Phytophthora** resistance tobacco

IT Disease resistance, **plant**

Phytophthora *nicotianae*

Transformation, genetic

(**Phytophthora** resistance through prodn. of a fungal
protein elicitor (.beta.-cryptogein) in tobacco)

IT Tobacco

(**transgenic**; **Phytophthora** resistance through prodn.
 of a fungal **protein elicitor** (.beta.-cryptogein) in
 tobacco)

IT 115742-70-6, .beta.-Cryptogein

RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BIOL (Biological study)
 (Phytophthora resistance through prodn. of a fungal
 protein elicitor (.beta.-cryptogein) in tobacco)

L19 ANSWER 9 OF 9 HCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1997:502748 HCAPLUS

DOCUMENT NUMBER: 127:119655

TITLE: Cloning of cDNA for glucan elicitor receptor of soybean and use for preparation of **transgenic plants** resistant to fungi

INVENTOR(S): Kakitani, Makoto; Umemoto, Naoyuki; Ishida, Isao; Yamaoka, Naoto

PATENT ASSIGNEE(S): Kirin Beer Kabushiki Kaisha, Japan; Kakitani, Makoto; Umemoto, Naoyuki; Ishida, Isao; Yamaoka, Naoto

SOURCE: PCT Int. Appl., 90 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9722242	A1	19970626	WO 1996-JP3653	19961213
W:	AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG			
AU 9711110	A1	19970714	AU 1997-11110	19961213
EP 879554	A1	19981125	EP 1996-941871	19961213
R:	AT, BE, CH, DE, ES, FR, GB, IT, NL, SE			
CN 1209038	A	19990224	CN 1996-199945	19961213
US 6225531	B1	20010501	US 1998-94557	19980615
PRIORITY APPLN. INFO.:			JP 1995-347823	A 19951215
			JP 1994-136100	A 19940617
			WO 1996-JP3653	W 19961213
			US 1997-591566	B2 19970714

AB The cDNA encoding a glucan elicitor receptor was isolated from soybean and its amino acid sequence (667 amino acids) deduced. A process for producing a plant resistant to pathogenic fungi by expression of the cDNA sequence in plants such as tobacco was shown. The resistance to pathogenic fungi was further enhanced by introducing the cDNA encoding glycanase of soybean into the tobacco plant.

IC ICM A01H005-00

ICS C12N015-29

CC 11-1 (Plant Biochemistry)

Section cross-reference(s): 3

ST soybean glucan elicitor receptor cDNA sequence; fungi resistance **transgenic plant** glycanase; tobacco fungi resistance

IT cDNA sequences

(for glucan elicitor receptor and glycanase; cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)

IT Gene, plant

RL: AGR (Agricultural use); BOC (Biological occurrence); BSU (Biological

- study, unclassified); PRP (Properties); BIOL (Biological study); OCCU (Occurrence); USES (Uses)
 (for glucan elicitor receptor and glycanase; cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)
- IT Receptors
 RL: AGR (Agricultural use); PRP (Properties); BIOL (Biological study); USES (Uses)
 (glucan elicitor; cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)
- IT **Protein** sequences
 (of glucan **elicitor** receptor and glycanase; cloning of cDNA for glucan **elicitor** receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)
- IT Fungi
Phytophthora
Phytophthora nicotianae
 Rhizoctonia
 Rhizoctonia solani
 (resistance to; cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)
- IT Legume (Fabaceae)
Plant (Embryophyta)
 Solanaceae
 Tobacco
 (**transgenic**; cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)
- IT 130175-92-7
 RL: AGR (Agricultural use); CAT (Catalyst use); BIOL (Biological study); USES (Uses)
 (amino acid sequence; cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)
- IT 173968-82-6, Receptor, glucan elicitor (soybean)
 RL: AGR (Agricultural use); PRP (Properties); BIOL (Biological study); USES (Uses)
 (amino acid sequence; cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)
- IT 130173-29-4, DNA (soybean clone pEG488 endo-1,3-.beta.-glucanase cDNA)
 RL: AGR (Agricultural use); BOC (Biological occurrence); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); OCCU (Occurrence); USES (Uses)
 (cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)
- IT 173968-81-5
 RL: AGR (Agricultural use); BOC (Biological occurrence); BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study); OCCU (Occurrence); USES (Uses)
 (nucleotide sequence; cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of **transgenic plants** resistant to fungi)
- IT 9025-37-0, Glucanase, endo-1,3-.beta.-
 RL: AGR (Agricultural use); CAT (Catalyst use); BIOL (Biological study); USES (Uses)
 (**plant** resistance to fungi enhanced by; cloning of cDNA for glucan elicitor receptor of soybean and use for prepn. of

Para 10/010,390

transgenic plants resistant to fungi)

=> fil biosis

FILE 'BIOSIS' ENTERED AT 12:12:42 ON 27 JAN 2003
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FILE COVERS 1969 TO DATE.
CAS REGISTRY NUMBERS AND CHEMICAL NAMES (CNs) PRESENT
FROM JANUARY 1969 TO DATE.

RECORDS LAST ADDED: 22 January 2003 (20030122/ED)

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(FILE 'BIOSIS' ENTERED AT 12:08:39 ON 27 JAN 2003)

DEL HIS Y

L1 950 S ELICITOR# (S) (PROTEIN# OR ?PEPTIDE?)
L2 95794 S DESSICCAT? OR DESICCAT? OR LONGEV? OR POSTHARVEST? OR HARVES
L3 5 S L1 AND L2
L4 97762 S-CLAVIBACTER OR ERWINIA OR PHYTOPHTHORA OR PSEUDOMONAS OR RALS
L5 265 S L4 AND L1
L6 232 S L5 AND PLANT#
L7 79764 S TRANSGEN? OR CUTTING?
L8 18 S L7 AND L6
L9 18 S L8 NOT L3
L10 17 S HYPERSENSITIVE RESPONSE ELICITOR#
L11 15 S L10 AND (L2 OR L7 OR L4)
L12 0 S L11 NOT (L10 OR L3)

FILE 'BIOSIS' ENTERED AT 12:12:42 ON 27 JAN 2003

=> d bib ab ct 13 1-5;d bib ab ct 111 1-15

L3 ANSWER 1 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 2000:502322 BIOSIS
DN PREV200000502322
TI Chitinase activity in tall fescue seedlings as affected by cultivar,
seedling development, and ethephon.
AU Marek, S. M.; Roberts, C. A. (1); Karr, A. L.; Sleper, D. A.
CS (1) Dep. of Agronomy, Univ. of Missouri, Columbia, MO, 65211 USA
SO Crop Science, (March April, 2000) Vol. 40, No. 3, pp. 713-716. print.
ISSN: 0011-183X.
DT Article
LA English
SL English
AB Recent reports indicate that tall fescue (*Festuca arundinacea* Schreb.) may be selected for increased disease resistance with the use of a marker such as chitinase, a defense **protein** associated with disease resistance in tall fescue. The objective of this study was to determine if chitinase activity in tall fescue cultivars differs consistently across seedling stage, and to determine if chitinase activity could be increased with ethephon ((2-chloroethyl)phosphonic acid), a growth regulator used as a chemical **elicitor**. Ten cultivars of tall fescue were planted in a greenhouse, and seedlings were **harvested** at 14, 28, and 42 d after germination. Seedlings were treated with and without ethephon 3 d prior to each **harvest**. Foliage was analyzed for total and specific chitinase activity. Both total and specific chitinase activity differed ($P < 0.01$) among cultivars and seedling stages. Highest ranking cultivars expressed at least 16% more total chitinase activity and 18%

more specific activity than the lowest ranking cultivars. Though chitinase activity changed drastically over seedling development, there were no cultivar X seedling stage interactions ($P < 0.01$) for total or specific activity. Ethephon increased total and specific activity only at the 0.06 and 0.07 probability level and was far less effective than biological **elicitors** used to increase chitinase in previous studies. We concluded that chitinase could serve as a consistent marker among tall fescue cultivars across seedling stages, but a more effective chemical **elicitor** would be desirable to increase chitinase activity.

IT Major Concepts

Agronomy (Agriculture); Enzymology (Biochemistry and Molecular Biophysics)

IT Chemicals & Biochemicals

chitinase; ethephon

L3 ANSWER 2 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.

AN 2000:256324 BIOSIS

DN PREV200000256324

TI Early events during quiescent infection development by *Colletotrichum gloeosporioides* in unripe avocado fruits.

AU Beno-Moualem, D.; Prusky, D. (1)

CS (1) Department of Postharvest Science of Fresh Produce, Agricultural Research Organization, Volcani Center, Bet Dagan, 50250 Israel

SO Phytopathology, (May, 2000) Vol. 90, No. 5, pp. 553-559. print..

ISSN: 0031-949X.

DT Article

LA English

SL English

AB Inoculation of avocado pericarp tissue with *Colletotrichum gloeosporioides* and treatment of avocado cell cultures with the cell wall **elicitor** of *C. gloeosporioides* both increased the production of reactive oxygen species (ROS). However, whereas the production of ROS could be detected within minutes in avocado cell suspensions, it was detected only after 2 h following inoculation of pericarp tissue. **Protein** kinase inhibitors such as K-252a and staurosporine and the phosphatase inhibitor microcystin-LR inhibited the release of H₂O₂ from avocado cell suspensions. When 1 mM H₂O₂ was exogenously applied to pericarp tissue, it enhanced ROS, phenylalanine ammonia lyase (PAL) activity, and epicatechin levels. But, when H₂O₂ treatment was applied following staurosporine treatment, PAL activity was no longer induced. The uninduced ROS production in pericarp tissue of freshly **harvested**, unripe, resistant fruit was twice as high as in ripe, susceptible fruit. Challenge inoculation of resistant fruit further increased the ROS level; however, this increase did not occur in susceptible fruits. The current findings are consistent with the hypothesis that production of ROS is induced by fungal infection of unripe fruits and, consequently, may modulate resistance, resulting in the inhibition of fungal development and quiescence.

IT Major Concepts

Horticulture (Agriculture); Infection; Pest Assessment Control and Management

IT Parts, Structures, & Systems of Organisms

fruit: reproductive system, unripe status

L3 ANSWER 3 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.

AN 1999:34705 BIOSIS

DN PREV19990034705

TI Differential induction of **proteins** in orange flavedo by biologically based **elicitors** and challenged by *Penicillium digitatum* Sacc.

- AU Fajardo, J. E.; McCollum, T. G.; McDonald, R. E.; Mayer, R. T.
 CS U.S. Horticultural Res. Lab., Agricultural Res. Service, U.S. Dep.
 Agriculture, 2120 Camden Road, Orlando, FL 32803-1419 USA
 SO Biological Control, (Nov., 1998) Vol. 13, No. 3, pp. 143-151.
 ISSN: 1049-9644.
 DT Article
 LA English
 AB The effects of biologically based inducing agents (**elicitors**)
 applied singly or in combination to **harvested** oranges were
 investigated for enhancing host resistance to green mold. Oranges (*Citrus*
sinensis cv. 'Valencia') treated with inducing agents and challenged by
 the green mold pathogen (*Penicillium digitatum*) showed a delay in the
 onset and progression of disease symptoms compared with inoculated fruits
 not treated with the **elicitors**. Chitosan (a preparation of
 ground crab shells), Margosan-O (an oil-based plant-derived product from
 neem seed) + Aspire (a water dispersible granule containing an
 antagonistic yeast), Aspire, and chitosan + Aspire reduced fruit decay 38,
 41, 42, and 44%, respectively. The inducing agents reduced disease
 incidence but not disease severity. Application of **elicitors**
 followed by inoculation with *P. digitatum* and *P. digitatum* infection alone
 increased total soluble **proteins** in the flavedo (the tissue that
 forms the outer colored rind) twofold relative to the untreated control.
 The flavedo is an important tissue that is vulnerable to
postharvest diseases especially at storage and transport of the
harvested crop. No apparent qualitative differences were
 visualized in **protein** patterns analyzed by SDS-PAGE of all
 treatments across all days of incubation. A temporal differential
 induction of chitinase, beta-1,3-glucanase, and peroxidase was
 demonstrated as a result of **elicitor** application followed by
 challenge inoculation with *P. digitatum*. Induction of these enzymes was
 corroborated by immunodetection. Lysozyme and a polygalacturonase-
 inhibiting **protein** were detected at low activity levels.
 However, the defensive **proteins** appeared to be constitutive and
 slightly induced but did not involve the de novo synthesis of novel
proteins.
 IT Major Concepts
 Horticulture (Agriculture)
 IT Chemicals & Biochemicals
 proteins
 L3 ANSWER 4 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
 AN 1997:71165 BIOSIS
 DN PREV199799370368
 TI Phycocyanin, a new elicitor for capsaicin and anthocyanin accumulation in
 plant cell cultures.
 AU Rao, S. Ramachandra; Sarada, R.; Ravishankar, G. A. (1)
 CS (1) Plant Cell Biotechnol. Dep., Central Food Technological Research
 Inst., Mysore-570 013 India
 SO Applied Microbiology and Biotechnology, (1996) Vol. 46, No. 5-6, pp.
 619-621.
 ISSN: 0175-7598.
 DT Article
 LA English
 AB **Elicitors** of both fungal and bacterial origin that is,
 polysaccharides, **proteins** and fatty acids, are widely used for
 enhancement of secondary metabolites in plant cell cultures. In the
 present study, phycocyanin a natural blue pigment that is the major light-
harvesting biliprotein in the blue-green alga *Spirulina platensis*
 was used as an **elicitor** to enhance the accumulation of capsaicin
 and anthocyanin in *Capsicum frutescens* and *Daucus carota* cell cultures

respectively. Phycocyanin at 0.3, 0.6 and 1.2 mg% in capsicum cell cultures elicited a more than two-fold increase in capsaicin content with maximum productivity of 192 µg/g fresh weight. Similarly in *Daucus carota* cell cultures a two-fold increase in anthocyanin content was obtained at 0.3 mg% with a maximum productivity of 24.8 mg% on a dry-weight basis. In both the systems, phycocyanin showed an early elicitation of secondary metabolites.

IT Major Concepts

Cell Biology; Metabolism; Methods and Techniques

IT Chemicals & Biochemicals

CAPSAICIN

L3 ANSWER 5 OF 5 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.

AN 1995:227320 BIOSIS

DN PREV199598241620

TI Changes in protein methylation associated with the elicitation response in cell cultures of alfalfa (*Medicago sativa* L.

AU Daniell, Timothy; Edwards, Robert

CS Dep. Biol. Sci., Univ. Durham, Durham DH1 3LE UK

SO FEBS Letters, (1995) Vol. 360, No. 1, pp. 57-61.

ISSN: 0014-5793.

DT Article

LA English

AB The methylation of endogenous **proteins** increased in alfalfa cell suspension cultures following treatment with a fungal **elicitor**. Carboxyl methylation, a post-translational modification associated with controlling the localisation and **longevity** of **proteins**, was the dominant form of **protein** methylation in both elicited and unelicited cells. **Protein** methylation was restricted to a limited number of **peptides** prior to **elicitor** treatment but as elicitation progressed the number of endogenous substrates increased. Increases resulted from a combination of an **elicitor**-dependent increase in the activity of a **protein** carboxyl methyltransferase and the accumulation of preferred endogenous substrates in the latter stages of elicitation.

IT Major Concepts

Biochemistry and Molecular Biophysics; Cell Biology; Enzymology (Biochemistry and Molecular Biophysics); Metabolism

IT Chemicals & Biochemicals

METHYLTRANSFERASE

L11 ANSWER 1 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.

AN 2002:420773 BIOSIS

DN PREV200200420773

TI Effects of Messenger(R) on disease resistance and plant growth enhancement in strawberry and cucumber.

AU Qiu, D. (1); Clayton, K. (1); Wei, Z.-M. (1)

CS (1) EDEN Bioscience Corporation, Bothell, WA USA

SO Phytopathology, (June, 2002) Vol. 92, No. 6 Supplement, pp. S67. print. Meeting Info.: 2002 Annual Meeting of the American Phytopathological Society Milwaukee, WI, USA July 27-31, 2002

ISSN: 0031-949X.

DT Conference

LA English

AB Messenger is a biopesticide containing 3% active ingredient harpin protein. Harpin is a proteinaceous **hypersensitive response elicitor** isolated from *Erwinia*

amylovora. Previous studies have indicated that when applied to plants, the harpin protein is recognized and triggers a complex set of signaling pathways that contribute to an overall acquired disease resistance in the plant. Plants treated with Messenger also demonstrate an increase in yield and a general plant growth enhancement effect. In recent studies, strawberry plants (Diamonte) were treated with Messenger at rates of 0, 1, 5, 10, 20, 40, 80 and 120 mg/ml. After Messenger treatment, the plants were inoculated with powdery mildew (*Sphaerotheca macularis* f. sp. *Fragariae*) or *Xanthomonas fragariae*. Disease resistance was determined by using a disease severity index. Messenger spray treatments substantially induced resistance in strawberries against strawberry powdery mildew and *Xanthomonas fragariae*. In separate studies, treatments of 10-40 mg/ml Messenger were shown to be sufficient to induce increases, over control plants, of 10 to 13% with respect to cucumber (Park's All Season Burpless) plants height and seedling dry weight; as well as strawberry plants height and leaf number.

IT Major Concepts

Horticulture (Agriculture); Pest Assessment Control and Management

IT Chemicals & Biochemicals

Messenger: biopesticide, disease resistance, hypersensitive response, pesticide, plant-growth enhancement; harpin protein:

hypersensitive response elicitor

L11 ANSWER 2 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.

AN 2002:135120 BIOSIS

DN PREV200200135120

TI Use of **hypersensitive response elicitor**

protein or polypeptide from *Clavibacter michiganensis* for disease resistance, growth enhancement and insect control.

AU Beer, Steven V.; Butler, Jerry L. (1)

CS (1) Woodinville, WA USA

ASSIGNEE: Cornell Research Foundation, Inc.; Eden Bioscience Corporation, Bothell, WA, USA

PI US 6333302 December 25, 2001

SO Official Gazette of the United States Patent and Trademark Office Patents, (Dec. 25, 2001) Vol. 1253, No. 4, pp. No Pagination.

<http://www.uspto.gov/web/menu/patdata.html>. e-file.

ISSN: 0098-1133.

DT Patent

LA English

AB The present invention is directed to the use of a protein or polypeptide from Gram positive bacteria, such as *Clavibacter michiganensis* subsp. *sepedonicus*, which elicits a hypersensitive response in plants. This protein or polypeptide can used to impart disease resistance to plants, to enhance plant growth, and/or to control insects on plants. This can be achieved by applying the **hypersensitive response elicitor** protein or polypeptide in a non-infectious form to plants or plant seeds under conditions where the protein or polypeptide contacts the cells of the plant or the plant seed and is effective to impart disease resistance, to enhance plant growth, and/or to control insects on plants or plants grown from the plant seeds.

IT Major Concepts

Agrichemicals

IT Parts, Structures, & Systems of Organisms

seeds

IT Chemicals & Biochemicals

hypersensitive response elicitor

polypeptide; **hypersensitive response**

elicitor protein

L11 ANSWER 3 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
 AN 2001:528585 BIOSIS
 DN PREV200100528585
 TI Hypersensitive response induced resistance in plants by seed treatment with a **hypersensitive response elicitor**.
 AU Qiu, Dewen; Wei, Zhong-Min; Beer, Steven V.
 ASSIGNEE: Cornell Research Foundation, Inc.
 PI US 6235974 May 22, 2001
 SO Official Gazette of the United States Patent and Trademark Office Patents, (May 22, 2001) Vol. 1246, No. 4, pp. No Pagination. e-file. ISSN: 0098-1133.
 DT Patent
 LA English
 AB The present invention relates to a method of imparting pathogen resistance to plants. This involves applying a **hypersensitive response elicitor** polypeptide or protein in a non-infectious form to a plant seed under conditions where the polypeptide or protein contacts cells of the plant seed. The present invention is also directed to a pathogen resistance imparting plant seed. Alternatively, **transgenic** plant seeds containing a DNA molecule encoding a **hypersensitive response elicitor** polypeptide, or protein can be planted in soil and a plant can be propagated from the planted seed under conditions effective to impart pathogen resistance to the plant.
 IT Major Concepts
 Immune System (Chemical Coordination and Homeostasis); Infection; Methods and Techniques
 IT Chemicals & Biochemicals
 DNA; **hypersensitive response elicitor** polypeptide

L11 ANSWER 4 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
 AN 2001:502755 BIOSIS
 DN PREV200100502755
 TI **Hypersensitive response elicitor** from *Erwinia amylovora*, its use, and encoding gene.
 AU Bogdanove, Adam J. (1); Kim, Jihyun Francis; Wei, Zhong-Min; Beer, Steven V.
 CS (1) Ithaca, NY USA
 ASSIGNEE: Cornell Research Foundation, Inc.
 PI US 6228644 May 08, 2001
 SO Official Gazette of the United States Patent and Trademark Office Patents, (May 8, 2001) Vol. 1246, No. 2, pp. No Pagination. e-file. ISSN: 0098-1133.
 DT Patent
 LA English
 AB The present invention is directed to an isolated protein or polypeptide which elicits a hypersensitive response in plants as well as an isolated DNA molecule which encodes the hypersensitive response eliciting protein or polypeptide. This isolated protein or polypeptide and the isolated DNA molecule can be used to impart disease resistance to plants, to enhance plant growth, and/or to control insects on plants. This can be achieved by applying the **hypersensitive response elicitor** protein or polypeptide in a non-infectious form to plants or plant seeds under conditions effective to impart disease resistance, to enhance plant growth, and/or to control insects on plants or plants grown from the plant seeds. Alternatively, **transgenic** plants or plant seeds transformed with a DNA molecule encoding a **hypersensitive response elicitor** protein or polypeptide can be provided and the **transgenic** plants or plants resulting from the

transgenic plant seeds are grown under conditions effective to impart disease resistance, to enhance plant growth, and/or to control insects on plants or plants grown from the plant seeds.

IT Major Concepts
Horticulture (Agriculture); Infection; Molecular Genetics (Biochemistry and Molecular Biophysics); Pest Assessment Control and Management
IT Chemicals & Biochemicals
DNA: encoding gene; hypersensitive response eliciting protein: from *Erwinia amylovora*

L11 ANSWER 5 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 2001:477350 BIOSIS
DN PREV200100477350
TI Enhancement of growth in plants.
AU Qiu, Dewen (1); Wei, Zhong-Min; Beer, Steven V.
CS (1) Seattle, WA USA
ASSIGNEE: Cornell Research Foundation, Inc.
PI US 6277814 August 21, 2001
SO Official Gazette of the United States Patent and Trademark Office Patents, (Aug. 21, 2001) Vol. 1249, No. 3, pp. No Pagination. e-file.
ISSN: 0098-1133.

DT Patent
LA English
AB The present invention relates to a method of enhancing growth of plants. This involves applying a **hypersensitive response elicitor** polypeptide or protein in a non-infectious form to a plant or plant seed under conditions effective to enhance growth of the plant or plants produced from the plant seed. Alternatively, **transgenic** plants or **transgenic** plant seeds transformed with a DNA molecule encoding a **hypersensitive response elicitor** polypeptide or protein can be provided and the **transgenic** plants or plants resulting from the **transgenic** plant seeds are grown under conditions effective to enhance plant growth.

IT Major Concepts
Methods and Techniques
IT Chemicals & Biochemicals
elicitor polypeptide

L11 ANSWER 6 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 2001:423743 BIOSIS
DN PREV200100423743
TI **Hypersensitive response elicitor** from *Erwinia amylovora* and its use.
AU Kim, Jihyun Francis (1); Beer, Steven V.
CS (1) Ithaca, NY USA
ASSIGNEE: Cornell Research Foundation, Inc.
PI US 6262018 July 17, 2001
SO Official Gazette of the United States Patent and Trademark Office Patents, (July 17, 2001) Vol. 1248, No. 3, pp. No Pagination. e-file.
ISSN: 0098-1133.

DT Patent
LA English
AB The present invention is directed to an isolated protein or polypeptide which elicits a hypersensitive response in plants as well as an isolated DNA molecule which encodes the hypersensitive response eliciting protein or polypeptide. This isolated protein or polypeptide and the isolated DNA molecule can be used to impart disease resistance to plants, to enhance plant growth, and/or to control insects on plants. This can be achieved by applying the **hypersensitive response elicitor** protein or polypeptide in a non-infectious form to plants or plant seeds

under conditions effective to impart disease resistance, to enhance plant growth, and/or to control insects on plants or plants grown from the plant seeds. Alternatively, **transgenic** plants or plant seeds transformed with a DNA molecule encoding a **hypersensitive response elicitor** protein or polypeptide can be provided and the **transgenic** plants or plants resulting from the **transgenic** plant seeds are grown under conditions effective to impart disease resistance, to enhance plant growth, and/or to control insects on plants or plants grown from the plant seeds.

IT Major Concepts

Methods and Techniques; Pest Assessment Control and Management

IT Chemicals & Biochemicals

hypersensitive response elicitor

L11 ANSWER 7 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.

AN 2001:333122 BIOSIS

DN PREV200100333122

TI **Hypersensitive response elicitor** from **Pseudomonas syringae** and its use.

AU Collmer, Alan; Charkowski, Amy (1); Alfano, James R.

CS (1) Oakland, CA USA

ASSIGNEE: Cornell Research Foundation, Inc.

PI US 6172184 January 09, 2001

SO Official Gazette of the United States Patent and Trademark Office Patents, (Jan. 9, 2001) Vol. 1242, No. 2, pp. No Pagination. e-file. ISSN: 0098-1133.

DT Patent

LA English

AB The present invention is directed to an isolated protein or polypeptide which elicits a hypersensitive response in plants as well as an isolated DNA molecule which encodes the hypersensitive response eliciting protein or polypeptide. This isolated protein or polypeptide and the isolated DNA molecule can be used to impart disease resistance to plants, to enhance plant growth, and/or to control insects on plants. This can be achieved by applying the **hypersensitive response elicitor** protein or polypeptide in a non-infectious form to plants or plant seeds under conditions effective to impart disease resistance, to enhance plant growth, and/or to control insects on plants or plants grown from the plant seeds. Alternatively, **transgenic** plants or plant seeds transformed with a DNA molecule encoding a **hypersensitive response elicitor** protein or polypeptide can be provided and the **transgenic** plants or plants resulting from the **transgenic** plant seeds are grown under conditions effective to impart disease resistance, to enhance plant growth, and/or to control insects on plants or plants grown from the plant seeds.

IT Major Concepts

Agronomy (Agriculture)

IT Chemicals & Biochemicals

polypeptide: hypersensitive response, isolation; protein: hypersensitive response, isolation

L11 ANSWER 8 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.

AN 2001:302811 BIOSIS

DN PREV200100302811

TI Harpin, a **hypersensitive response elicitor** from **Erwinia amylovora**, regulates ion channel activities in *Arabidopsis thaliana* suspension cells.

AU El-Maarouf, Hayat; Barny, Marie Anne; Rona, Jean Pierre; Bouteau, Francois (1)

CS (1) Laboratoire d'Electrophysiologie des Membranes, Universite Paris 7, 2

- Place Jussieu, 75251, Paris Cedex 05: bouteau@ccr.jussieu.fr France
- SO FEBS Letters, (25 May, 2001) Vol. 497, No. 2-3, pp. 82-84. print.
ISSN: 0014-5793.
- DT Article
- LA English
- SL English
- AB HrpN, the **hypersensitive response elicitor**
from *Erwinia amylovora*, stimulated K⁺ outward rectifying
currents in *Arabidopsis thaliana* suspension cells. It also decreased anion
currents. These data demonstrate the ability of harpin to regulate
different plasma membrane ion channels, putative components of signal
transduction chains leading to defense responses and programmed cell
death.
- IT Major Concepts
Biochemistry and Molecular Biophysics; Membranes (Cell Biology)
- IT Parts, Structures, & Systems of Organisms
plasma membrane
- IT Chemicals & Biochemicals
harpin: **hypersensitive response elicitor**;
ion channels; potassium ion: outward rectifying currents
-
- L11 ANSWER 9 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
- AN 2001:292735 BIOSIS
- DN PREV200100292735
- TI Disruption of microtubular cytoskeleton induced by cryptogein, an elicitor
of hypersensitive response in tobacco cells.
- AU Binet, Marie-Noelle (1); Humbert, Claude; Lecourieux, David; Vantard,
Marylin; Pugin, Alain
- CS (1) Biochimie, Biologie Cellulaire et Ecologie des Interactions
Plantes/Micro-Organismes, Unite Mixte de Recherche, Institut National de
la Recherche Agronomique, Universite de Bourgogne, 17 Rue Sully, BV 86510,
21065, Dijon Cedex: binet@dijon.inra.fr France
- SO Plant Physiology (Rockville), (February, 2001) Vol. 125, No. 2, pp.
564-572. print.
ISSN: 0032-0889.
- DT Article
- LA English
- SL English
- AB The dynamics of microtubular cytoskeleton were studied in tobacco
(*Nicotiana tabacum* cv Xanthi) cells in response to two different plant
defense elicitors: cryptogein, a protein secreted by **Phytophthora**
cryptogea and oligogalacturonides (OGs), derived from the plant cell wall.
In tobacco plants cryptogein triggers a hypersensitive-like response and
induces systemic resistance against a broad spectrum of pathogens, whereas
OGs induce defense responses, but fail to trigger cell death. The
comparison of the microtubule (MT) dynamics in response to cryptogein and
OGs in tobacco cells indicates that MTs appear unaffected in OG-treated
cells, whereas cryptogein treatment caused a rapid and severe disruption
of microtubular network. When hyperstabilized by the MT depolymerization
inhibitor, taxol, the MT network was still disrupted by cryptogein
treatment. On the other hand, the MT-depolymerizing agent oryzalin and
cryptogein had different and complementary effects. In addition to MT
destabilization, cryptogein induced the death of tobacco cells, whereas
OG-treated cells did not die. We demonstrated that MT destabilization and
cell death induced by cryptogein depend on calcium influx and that MT
destabilization occurs independently of active oxygen species production.
The molecular basis of cryptogein-induced MT disruption and its potential
significance with respect to cell death are discussed.
- IT Major Concepts
Cell Biology; Infection

IT Parts, Structures, & Systems of Organisms
microtubules: cytoskeleton

IT Chemicals & Biochemicals
cryptogein: **hypersensitive response**
elicitor

L11 ANSWER 10 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 2000:277636 BIOSIS
DN PREV200000277636
TI Insect control with a **hypersensitive response**
elicitor.
AU Zitter, Thomas A. (1); Wei, Zhong-Min
CS (1) Kirkland, WA USA
ASSIGNEE: Cornell Research Foundation, Inc., Ithaca, NY, USA; EDEN
Bioscience, Bothell, WA, USA
PI US 5977060 November 02, 1999
SO Official Gazette of the United States Patent and Trademark Office Patents,
(Nov. 2, 1999) Vol. 1228, No. 1, pp. No pagination. e-file.
ISSN: 0098-1133.
DT Patent
LA English
AB The present invention relates to a method of controlling insects on
plants. This involves applying a **hypersensitive response**
elicitor polypeptide or protein in a non-infectious form to a
plant or plant seed under conditions effective to control insects on the
plant or plants produced from the plant seed. Alternatively,
transgenic plants or **transgenic** plant seeds transformed
with a DNA molecule encoding a **hypersensitive response**
elicitor polypeptide or protein can be provided and the
transgenic plants or plants resulting from the **transgenic**
plant seeds are grown under conditions effective to control insects.

IT Major Concepts
Biochemistry and Molecular Biophysics; Pesticides

IT Chemicals & Biochemicals
hypersensitive response elicitor
polypeptide

L11 ANSWER 11 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 1999:72154 BIOSIS
DN PREV199900072154
TI **Hypersensitive response elicitor** from
Erwinia chrysanthemi.
AU Bauer, D.; Collmer, A.
CS Ithaca, N.Y. USA
ASSIGNEE: CORNELL RESEARCH FOUNDATION, INC.
PI US 5850015 Dec. 15, 1998
SO Official Gazette of the United States Patent and Trademark Office Patents,
(Dec. 15, 1998) Vol. 1217, No. 3, pp. 2676.
ISSN: 0098-1133.
DT Patent
LA English
IT Major Concepts
Biochemistry and Molecular Biophysics; Genetics; Infection; Pathology

L11 ANSWER 12 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 1998:473400 BIOSIS
DN PREV199800473400
TI Global regulation by the small RNA-binding protein CsrA and the non-coding
RNA molecule CsrB.
AU Romeo, Tony (1)

- CS (1) Dep. Mol. Biol. Immunol., Univ. North Tex. Health Sci. Cent. at Fort Worth, 3500 Camp Bowie Blvd., Fort Worth, TX 76107-2699 USA
- SO Molecular Microbiology, (Sept., 1998) Vol. 29, No. 6, pp. 1321-1330. ISSN: 0950-382X.
- DT Article
- LA English
- AB Csr (carbon storage regulator) is a recently discovered global regulatory system that controls bacterial gene expression post-transcriptionally. Its effector is a small RNA-binding protein referred to as CsrA or, in phytopathogenic *Erwinia* species, RsmA (repressor of stationary phase metabolites). Numerous genes whose expression occurs in the stationary phase of growth are repressed by csrA/rsmA, and csrA activates certain exponential-phase metabolic pathways. Glycogen synthesis and catabolism, gluconeogenesis, glycolysis, motility, cell surface properties and adherence are modulated by csrA in *Escherichia coli*, while the production of several secreted virulence factors, the plant **hypersensitive response elicitor** HrpNEcc and, potentially, other secondary metabolites are regulated by rsmA in *Erwinia carotovora*. CsrA represses glycogen synthesis by binding to and destabilizing glgCAP mRNA and is hypothesized to repress other genes by a similar mechanism. The second component of the Car system is CsrB (AepH in *Erwinia* species), a noncoding RNA molecule that forms a large globular ribonucleoprotein complex with approximately 18 CsrA subunits and antagonizes the effects of CsrA in vivo. Highly repeated sequence elements found within the loops of predicted stem-loops and other single-stranded segments of CsrB RNA may facilitate CsrA binding. Current information supports a model in which CsrA exists in an equilibrium between CsrB and CsrA-regulated mRNAs, which predicts that CsrB levels may be a key determinant of CsrA activity in the cell. The presence of csrA homologues in phylogenetically diverse species further suggests that this novel kind of regulatory system is likely to play a broad role in modulating eubacterial gene expression.
- IT Major Concepts
Bacteriology; Biochemistry and Molecular Biophysics; Molecular Genetics (Biochemistry and Molecular Biophysics)
- IT Chemicals & Biochemicals
csrA gene: homologs; glgCAP mRNA [glgCAP messenger RNA]: destabilization; glycogen: catabolism, modulation, synthesis; plant **hypersensitive response elicitor** HrpN-Ecc: production regulation; virulence factors: production regulation; AepH molecule: non-coding RNA molecule; CsrA protein: RNA-binding protein, activity, gene repressor; CsrB molecule: non-coding RNA molecule; RsmA protein: gene repressor
- L11 ANSWER 13 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
- AN 1997:329607 BIOSIS
- DN PREV199799628810
- TI Treatment of tomato seed with harpin enhances germination and growth and induces resistance to *Ralstonia solanacearum*.
- AU Qiu, D.; Wei, Z.-M.; Bauer, D. W.; Beer, S. V.
- CS Dep. Plant Pathol., Cornell Univ., Ithaca, NY 14853 USA
- SO Phytopathology, (1997) Vol. 87, No. 6 SUPPL., pp. S80.
Meeting Info.: Annual Meeting of the American Phytopathological Society
Rochester, New York, USA August 9-13, 1997
ISSN: 0031-949X.
- DT Conference; Abstract
- LA English
- IT Major Concepts
Biochemistry and Molecular Biophysics; Development; Horticulture (Agriculture); Infection; Pathology; Pest Assessment Control and

Management; Physiology

L11 ANSWER 14 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 1997:329207 BIOSIS
DN PREV199799628410
TI Effect of harpin on Arabidopsis thaliana.
AU Dong, H.; Bauer, D. W.; Delaney, T. P.; Beer, S. V.
CS Dep. Plant Pathol., Cornell Univ., Ithaca, NY 14853 USA
SO Phytopathology, (1997) Vol. 87, No. 6 SUPPL., pp. S24-S25.
Meeting Info.: Annual Meeting of the American Phytopathological Society
Rochester, New York, USA August 9-13, 1997
ISSN: 0031-949X.
DT Conference; Abstract
LA English
IT Major Concepts
Infection; Pathology

L11 ANSWER 15 OF 15 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 1990:123321 BIOSIS
DN BR38:57531
TI A MODEL FOR THE GENE-FOR-GENE INTERACTION BETWEEN PSEUDOMONAS
-SYRINGAE AND SOYBEAN.
AU TAMAKI S J; STAYTON M M; KOBAYASHI D
CS CLEARGENE INC., UNIV. CALIF.-RICHMOND FIELD STATION, RICHMOND, CALIF.
94804-4698.
SO ANNUAL MEETING OF THE AMERICAN PHYTOPATHOLOGICAL SOCIETY, RICHMOND,
VIRGINIA, USA, AUGUST 20-24, 1989. PHYTOPATHOLOGY. (1989) 79 (10), 1144.
CODEN: PHYTAJ. ISSN: 0031-949X.
DT Conference
FS BR; OLD
LA English